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Attentional Bias and Subjective Risk in Hypochondriacal Concern.

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Attentional bias and subjective risk in hypochondriacal concern

Hitchcock, Polly Beth, Ph.D.

The Louisiana State University and Agricultural and Mechanical Col., 1993

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ATTENTIONAL BIAS AND SUBJECTIVE RISK IN HYPOCHONDRIACAL CONCERN

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by

Polly Hitchcock

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For Jim and my parents,
who made this possible with
their support and love

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ABSTRACT

Although cognitive theories suggest that attentional bias to illness stimuli and inflation of subjective risk of future negative health events are etiologically related to hypochondriacal concern, little empirical research has been conducted on these cognitive distortions. The present study investigated attentional bias, as inferred from RTs on an attentional search information processing paradigm, and subjective risk, as measured by probability judgments of future health events, in 200 medical outpatients differing in level of hypochondriacal concern. It was hypothesized that hypochondriacal concern would be associated with specific cognitive biases for illness-related, as opposed to socially threatening, stimuli. It was also hypothesized that dysphoric mood would interact with the cognitive distortions in the prediction of hypochondriacal concern. An exploratory path analysis also tested the proposed causal contributions of objective health status, minor life events, depressed mood, attentional bias, and subjective risk in the production of hypochondriacal concern. The results indicated, however, that attentional bias to socially threatening stimuli accounted for more variance in hypochondriacal concern than illness cues. Also unexpected was the finding that subjects tended to rate future positive health events as more likely to occur than negative health events as hypochondriacal concern increased in the sample. Although the results generally failed to support the hypothesis that illness-specific cognitive distortions are related to hypochondriacal

concern, several factors which may have contributed to the negative findings were identified. Further investigations of cognitive distortions in individuals diagnosed with DSM-III-R hypochondriasis appears warranted.

INTRODUCTION

Hypochondriasis is one of the most poorly understood and inadequately researched phenomena in psychology (Turner, Jacob, & Morrison, 1984). Much of what has been written about hypochondriasis has been based upon clinical observations or assumptions, rather than on experimental evidence. Various theories have invoked factors ranging from unconscious, intrapsychic conflicts (Hyler & Sussman, 1984) to heightened perceptual sensitivity (Hanback & Revelle, 1978). Recently, however, cognitive theories have been proposed to account for the origin and maintenance of hypochondriacal concern (e.g., Barsky & Klerman, 1983; Warwick, 1989; Warwick & Salkovskis, 1990). Such approaches would seem well suited to explaining hypochondriasis, the primary diagnostic features of which include preoccupations, false beliefs, irrational fears and misinterpretations.

The purpose of this paper is to examine the role of cognitive factors in the etiology of hypochondriasis. A historical review, clinical description, prevalence rates, and sociodemographic factors of hypochondriasis will be presented first. The assessment techniques utilized with hypochondriasis will also be explored. Following this will be a review of the major etiological theories of hypochondriasis and a rationale for the investigation of cognitive factors in hypochondriasis. Information will then be presented regarding cognitive factors in emotional disorders and their assessment with objective, information processing strategies. At the conclusion of this paper, a study examining attentional bias and subjective risk in individuals differing in levels of hypochondriacal

concern is presented. The study also addresses the interaction of stressful life events and mood with hypochondriacal concern, as well as the specificity of cognitive distortions as they relate to physically threatening information. The results of the study, as well as implications for future research, are discussed.

REVIEW OF THE LITERATURE

Historical Views of Hypochondriasis

The term "hypochondriasis" was coined by Galen in the 2nd century A.D. to describe a form of melancholia and is derived from Greek words which refer to the upper abdominal area (Turner, Jacob, & Morrison, 1984). Later in the 17th and 18th centuries, the word was applied to suspected organic pathology of the "hypochondriacal organs", such as the stomach, liver, and spleen (Hyler & Sussman, 1984). Over time, hypochondriasis was increasingly used as a fashionable explanation for a variety of ills. Hypochondriasis gradually became associated with hysteria, with the former term being applied mostly to men, while the later was diagnosed more frequently in women (Turner et al., 1984). With continued indiscriminate diagnostic usage, it was eventually abandoned as a disease concept and was increasingly used by clinicians as a pejorative label for difficult patients (Turner et al., 1984). During the late 19th century, the term evolved into its present usage as a description of a psychiatric condition characterized by a fear of and preoccupation with imagined disease (Kenyon, 1976).

Around the turn of the century, Freud introduced his formulation of hypochondriacal neurosis. He postulated that hypochondriasis was a drive derivative produced by a disturbance of libido discharge (Hyler & Sussman, 1984). Later psychoanalytic theories conceptualized hypochondriasis as transformed aggression (e.g., Brown & Valliant, 1981) and also as a defense mechanism (e.g., McCranie, 1979). According to Hyler and Sussman (1984), the most popular

psychodynamic formulation of the disorder suggests that hypochondriasis develops in order to fulfill unmet dependency needs. In their review, Barsky and Klerman (1983) concluded that the various psychodynamic conceptualizations of hypochondriasis are based on impressionistic, anecdotal, and uncontrolled evidence.

Clinical Description and Diagnosis of Hypochondriasis

Hypochondriasis was not even listed in the first diagnostic manual of the American Psychiatric Association (APA, 1952) but appeared in the second manual (APA, 1968) as a form of neurosis (Turner et al., 1984). The diagnostic criteria for the disorder, however, were vague and heavily influenced by Freudian concepts. A major change occurred in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; APA, 1980) when hypochondriasis was listed as an independent syndrome categorized with the newly formed section of somatoform disorders.

Current diagnostic criteria for hypochondriasis in the revised third edition of the Diagnostic and Statistical Manual of Mental Disorders (APA, 1987) include:

- 1) preoccupation with the fear of having, or the belief that one has, a serious disease, based on the person's interpretation of physical signs or sensations as evidence of physical illness;
- 2) appropriate physical evaluation does not support the diagnosis of any physical signs or sensations or the person's unwarranted interpretation of them, and the symptoms ... are not just symptoms of panic attacks; and 3) the fear of having, or belief that one has, a disease persists despite medical reassurance; ... but 4) the belief is not of delusional intensity. (p. 261)

Associated features include strained doctor-patient relationships and "doctor-shopping". A duration of at least six months is required for the diagnosis (APA, 1987).

Diagnostic Validity of Hypochondriasis

In spite of its adoption into the diagnostic nomenclature, debate has continued over whether hypochondriasis is a discrete diagnostic entity or a symptom (Barsky & Klerman, 1983). After reviewing the literature and case records of 512 patients given a chart diagnosis of hypochondriasis, Kenyon (1964) concluded that hypochondriasis does not exist as a primary state. Critics of the DSM classification system (e.g., Barsky & Klerman, 1983) point out that the somatization of hypochondriasis (i.e., the expression of emotional discomfort and psychosocial stress in the physical language of bodily symptoms) can occur secondary to other conditions, such as anxiety disorders and schizophrenia.

For example, several authors (e.g., Brink, 1982; DeAlcaron, 1964) have reported that hypochondriasis is most likely to occur as a result of depression in the elderly, noting the frequent clinical reports of hypochondriacal concern in aged medical patients. In their review of the literature, however, Costa and McCrae (1985) noted that reports of increased hypochondriacal concern in the elderly are confounded by real health changes with age. They concluded that the stereotype of the elderly hypochondriac is unfounded. More recently, hypochondriasis has been implicated as an associated feature in panic disorder (Noyes, Reich, Clancy, & O'Gorman, 1986) and agoraphobia (Fava, Kellner, Zielezny, & Grandi, 1988).

Uncontrolled studies by these research groups suggest that when the underlying "true" disorder (e.g., panic) was treated, the hypochondriacal attitudes diminished even though these concerns were not specifically targeted by treatment.

Other authors, however, feel that hypochondriasis in its primary form is a valid diagnostic category. For example, Kellner and his associates (1987) compared attitudes of DSM-III diagnosed hypochondriacs to matched family practice patients, nonpatient employees, and non-hypochondriacal psychiatric patients. Results supported the existence of a discrete syndrome, consistent with the DSM-III conceptualization of hypochondriasis. Barsky, Wyshak, and Klerman (1986) report considerable consistency and internal validity for the diagnosis of hypochondriasis. Appleby (1987) argues that viewing hypochondriacal symptoms as "masks" of other psychiatric disorders ignores evidence that supports the validity of this diagnostic entity. Moreover, clinical anecdotes and uncontrolled studies suggest that a substantial proportion of these patients recover or improve with techniques that specifically target primary hypochondriacal concerns and behaviors (Kellner, 1986).

Salkovskis and Warwick (1986) suggest that hypochondriacal concerns run along a continuum from the mild transient concerns over unusual bodily sensations to the excessive preoccupation found in some individuals whose thought and activity are centered around illness. Therefore, hypochondriasis may exist as a valid diagnostic entity in cases of extreme hypochondriacal concern. In addition, hypochondriacal concerns of varying degrees may appear in

individuals with other psychiatric diagnoses, as well as in the normal public. For example, mild, transient hypochondriacal concerns are often found in beginning medical students, patients recovering from acute and life-threatening illness, and individuals who have recently lost a family member to a disease (Barsky & Klerman, 1983).

Prevalence and Sociodemographic Variables Associated with Hypochondriasis

As Kellner (1985) notes, functional somatic symptoms are ubiquitous in the general population. About 60-80% of the public will experience at least one somatic symptom in any one week (Pennebaker, 1982). Various reports suggest that between 20 and 84% of medical outpatients complain of somatic symptoms for which no organic cause can be found (Kellner, 1986). Excessive symptom reporting and overutilization of medical services may reflect either hypochondriacal concerns, or one of a number of other poorly understood conditions, such as somatization and conversion disorder (Warwick, 1989). It has been estimated that patients with excessive health anxiety are responsible for 50% of the cost of adult ambulatory general health care (Barsky & Klerman, 1983).

A methodologically adequate diagnostic survey of the prevalence of hypochondriasis in a representative sample of the general population has yet to be conducted (Kellner, 1986). Examination of the reported prevalence of the diagnosis of hypochondriasis among psychiatric patients, however, has yielded estimates ranging from 0 to 12.5 percent (Kellner, 1986). In the most rigorously derived study published to date (Barsky, Wyshak, Klerman, & Latham, 1990),

the six-month prevalence rate of DSM-III-R diagnosed hypochondriasis among medical outpatients was estimated to be between 4.2% and 6.3% of consecutive attenders at a general medical clinic.

One of the biggest controversies in hypochondriasis research has centered on age distribution of the disorder. While several early studies (e.g., Brink, 1982) suggested that hypochondriasis is primarily a disorder of the elderly, Costa and McCrae (1985) concluded in their review that hypochondriacal complaints are stable across the age span. Similarly, Kellner (1986) suggests that with the possible exception of the depressed elderly, findings on the relation between hypochondriasis and age are inconclusive.

Reports of the gender distribution of hypochondriasis also lack consensus. Although the DSM-III-R (APA, 1987) states that the disorder is equally common in both sexes, clinical lore suggests that hypochondriasis is diagnosed more frequently in women than in men (Hyler & Sussman, 1984). Some studies (e.g., Kenyon, 1976), however, have actually found the disorder to be more prevalent in males. No significant differences emerge between the sexes in the prevalence of self-reported hypochondriacal concerns in normal subjects (Kellner, 1986). In the previously cited study of prevalence rates in medical outpatients (Barsky et al., 1990), female hypochondriacs outnumbered their male counterparts by 3:1, but the ratio did not differ significantly from that of the clinic population as a whole. Furthermore, no sex differences were found in reported hypochondriacal symptomatology. When compared to a control group, the hypochondriacal patients did not differ significantly in any

sociodemographic risk factors except that they were significantly more likely to be black. This finding supports numerous cross-cultural studies which suggests wide variations in specific hypochondriacal complaints and attitudes across ethnic groups and countries (Barsky & Klerman, 1983; Turner et al., 1984).

Assessment of Hypochondriasis

The assessment of hypochondriasis has relied mainly on the use of questionnaires. The Illness Attitude Scales (Kellner, 1986) and the Whitely Index (Pilowsky, 1967) are self-report instruments that focus on hypochondriacal attitudes and beliefs rather than on reports of somatic symptoms. Principal components analysis or factor analysis of such measures typically yield multiple factors such as disease phobia, disease conviction, and bodily preoccupations (Kellner, 1986). Such questionnaires have demonstrated adequate reliability and validity, and are effective in discriminating between psychiatric patients diagnosed as hypochondriacal and those who are not (Barsky & Wyshak, 1989). Kellner (1986) cautions, however, that the use of such scales can yield misleading results in patients who have a serious physical disease.

The Hs clinical scale of the Minnesota Multiphasic Personality Inventory (McKinley & Hathaway, 1940) was originally developed to identify individuals who manifest a pattern of symptoms associated with the label of hypochondriasis (Graham, 1987). Although the 33-items in the scale assess vague somatic complaints, it is not a pure measure of hypochondriasis (Kellner, 1986). Patients with organic diseases, other somatoform disorders, anxiety, and depression also

tend to score high on the scale (Graham, 1987). Several other inventories exist which measure self-reported somatic symptoms (e.g., Wahler Physical Symptoms Inventory; Wahler, 1983) or abnormal illness behavior (e.g., Illness Behavior Inventory; Turkat & Pettegrew, 1983). Although these measures appear to be correlated with hypochondriacal attitudes, they do not directly assess the purported cognitive distortions of hypochondriacal beliefs and attitudes which constitute the disorder's primary diagnostic criteria.

Questionnaires which rely upon self-reports of physical symptoms or illness behavior are confounded with the behavioral and somatic effects of organic illness, and add little to the understanding of hypochondriasis (Mabe, Hobson, Jones, & Jarvis, 1988). Such measures would be unlikely to effectively discriminate between hypochondriasis and other somatoform disorders or organic disease. Therefore, self-reports of physical symptoms or illness behavior provide only half of the story of hypochondriasis (Costa & McCrae, 1985). According to Mabe and his associates (1988), studies of hypochondriasis in medical populations have generally been flawed because of insufficient attention to objective health status. Costa and McCrae (1985) concur, arguing that the diagnosis of hypochondriasis depends upon the discrepancy between subjective and objective health. Excessive symptom complaints or overutilization of medical services cannot be equated with hypochondriasis in the absence of objective medical information (Zonderman, Heft, & Costa, 1985).

Two of the most methodologically adequate studies of hypochondriasis published to date have included objective ratings of

patient health status. In a study of medical inpatients, a composite index of hypochondriacal traits was created from the Whitely Index (Pilowsky, 1967), the discrepancy between the subject's and physician's ratings of the severity of subject's illness, and the physician's ratings of the extent to which the presentation of the subject's illness was disproportionate to demonstrable disease (Mabe et al., 1988). Correlations between the Discrepancy Score, Physician Ratings, and the Whitely Index, however, were insignificant. The physician ratings were based upon a single interview; ratings supplemented with a chart review could possibly have increased reliability. In a study of general medical outpatients, Barsky, Wyshak, and Klerman (1986) conducted an audit of medical records and diagnoses were judged by predetermined criteria as to the severity of illness. The number of major and minor medical diagnoses were not correlated with self-reported hypochondriacal attitudes in hypochondriacal patients. Strategies such as these which rule out severe organic illness and provide objective evidence of the discrepancy between patients' fears and disease status may provide the most valid assessment of hypochondriasis (Mabe et al., 1988).

Contemporary Etiological Theories of Hypochondriasis

In the 50s and 60s, Parsons (1951) and Mechanic and Volkart (1960, 1961) revolutionized the way illness and somatization could be conceptualized with the introduction of such concepts as illness behavior, the sick role, and symptom reporting. Pilowsky (1967) applied these ideas to hypochondriacs and reframed them as abnormal illness behaviors, noting the discrepancy between the nature and

degree of hypochondriacs' claim to the sick role and their lack of organic pathology. This formulation of hypochondriasis suggested that social learning factors such as parental modeling and reinforcement of illness behaviors were primary etiological agents (Mechanic, 1972). This conceptualization provided an objective description of the syndrome that was more empirically-based than psychodynamic models. While popular, this model raised as many questions as it answered and prompted a search for important moderating variables within illness behavior.

Physiological disturbance is another factor that has been explored in hypochondriasis. Nemiah (1977) has proposed that hypochondriacal and psychosomatic patients may suffer from alexithymia, a neurophysiological inability to experience emotion, but no such deficit has been experimentally confirmed (Warwick & Salkovskis, 1990). A wide body of research does suggest, however, that individual differences exist in the visceral or perceptual experience of kinesthetic, visual, auditory, somatosensory, and pain stimuli (Barsky, Wyshak, & Klerman, 1990). Therefore, some researchers have proposed psychophysiological explanations for hypochondriasis, suggesting that heightened perceptual sensitivity or reduced pain thresholds are responsible for the disorder (Kellner, 1986).

The few empirical studies conducted with hypochondriacal subjects are supportive of this theory. For example, patients with disease conviction and disease phobia have been found to have lower thresholds for and tolerance to experimental pain (Bianchi, 1971;

Merskey & Evans, 1975). Similarly, Petrie (1978) has documented that hypochondriacal normals exhibit a lower tolerance for experimental pain, as well as kinesthetic amplification (i.e., overestimation of the size of objects held in hands while blindfolded). Hanback and Revelle (1978) demonstrated that hypochondriacal normals are more visually sensitive to dual flicker fusion of light. Several studies also suggest that hypochondriacs are more sensitive to or reactive to normal physiological sensations (Barsky & Wyshak, 1990). For example, hypochondriacal out-patients were more accurate in estimations of cardiac function than phobic patients (Tyrer, Lee, & Alexander, 1980). Wright, Kane, Olsen, and Smith (1977) found that hypochondriacal subjects report respiratory symptoms disproportionate to the results of pulmonary function tests.

In this conceptualization of hypochondriasis, the clinical characteristics of bodily preoccupation, disease conviction, and doctor-shopping are caused by heightened perceptual sensitivity. Equally plausible is that increased attention to bodily sensations heightens perceptual sensitivity (Barsky & Klerman, 1983; Pennebaker, 1982). While the studies cited above are suggestive, they are ultimately flawed because subjects in each of the experiments were aware of the experimental condition, or were asked to focus their attention upon physical sensations. The proof that hypochondriasis is caused by heightened perceptual sensitivity can only be provided by an experiment in which internal sensations are directly manipulated without subjects' knowledge. None exist in the

literature, reflecting the methodological and ethical difficulties that would be involved in such an experiment.

Barsky and Klerman (1983) suggest that the key feature of the disorder involves the abnormal amplification or augmentation of normal bodily sensations by selective attention to or the misinterpretation of innocuous physical sensations. For example, the symptoms so frequently complained about by hypochondriacs are those that commonly occur with stress (Kenyon, 1964; Mechanic, 1972) and/or have a very high prevalence in the general population (Kellner, 1986). Factors that may be involved in the amplification of normal bodily symptoms include anxiety (Barsky & Klerman, 1983), conditioning, or social learning (Kellner, 1986). Pennebaker (1982) has also demonstrated that simply directing a person's attention to bodily sensations increases reports of physical symptoms. Selective attention to the "internal", physical environment may thus augment or amplify bodily sensations and produce hypochondriacal concerns (Barsky & Klerman, 1983). Pennebaker (1982) also suggests that hypochondriacs also search for and attend to illness-related stimuli in the external environment (e.g., health columns in the newspapers).

Barsky and Klerman (1983) have therefore concluded that hypochondriasis is best conceptualized as a cognitive abnormality in that patients: 1) incorrectly assess and misattribute the somatic symptoms of emotional arousal and of normal bodily function and 2) consistently think and perceive in physical and concrete terms rather in emotional and subjective terms. Warwick (1989) has elaborated upon this idea in a cognitive-behavioral theory of hypochondriasis.

She proposes the initial stage of the disorder is characterized by the perception of an intrusive, health-related stimulus such as a physical sensation. The stimulus may be erroneously appraised as threatening if the individual holds inaccurate health beliefs or has past personal experience of medical mismanagement. Negative thoughts and images of a threat to health will be associated with anxiety, which in turn may be associated with increased physiological arousal and attentional focus on bodily sensations. These may then be interpreted by the patient as further evidence of illness. A range of avoidant behaviors, bodily checking, and reassurance seeking may serve as maintaining factors until a vicious circle is established, resulting in preoccupation with physical symptoms and health (Warwick, 1989).

Stress and Hypochondriasis

While stress has been implicated in symptom-reporting among normals (e.g., Banks & Gannon, 1988), theory and research suggest that there is a special interaction between emotional distress and abnormal illness fears. Psychodynamic theories and clinical lore suggests that these patients repress or deny emotional distress (Hyler & Sussman, 1984). Cognitive-behavioral theories suggest that hypochondriacs misinterpret the somatic manifestations of emotional arousal or stress as signs of illness (e.g., Barsky & Klerman, 1983). Research has documented the adoption of the sick role (e.g., Mechanic & Volkart, 1961), and the overutilization of medical services in somatizers (e.g., Miranda, Perez-Stable, Munoz, Hargreaves, & Henke,

1991) under stress. Thus, both clinical lore and research suggest that hypochondriacal concerns intensify during periods of stress.

Seminal formulations of stress in the social sciences (e.g., Holmes & Rahe, 1967) attempted to quantify major life events such as divorce or job change. Although stress is presumed to be a factor in symptom complaints and the initiation and maintenance of illness, the relation has often been obscured by difficulties in temporally linking major life events to the onset and expression of symptoms (Brantley & Jones, 1989). More recently, the concept of stress has been expanded to include minor stress or "hassles" (Brantley, Waggoner, Jones, & Rappaport, 1987; DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982; Kanner, Coyne, Schaeffer, & Lazarus, 1981). Examples of minor stress include such things as being interrupted while relaxing or being late to an appointment. The temporal relation to physical symptoms is more easily ascertained for recent, minor stressors than for global, retrospectively recalled major life events. More importantly, however, minor stress appears to account for more of the variance in symptom-reporting than major life events (e.g., Brantley & Jones, 1989) and contributes information independently of what can be attributed to major life events in the stress-illness relation (DeLongis et al., 1982).

Research suggests that two important factors, the global number of stressors and the perceived impact of the stressors (Lazarus & Folkman, 1984), contribute to the stress response. Although theories and clinical lore imply that hypochondriacs repress or deny emotion and experience stress somatically, little research has been conducted

which examines their patterns of endorsement of these two aspects of minor life events. Somatizers, for example, may endorse frequency levels of minor stressors similar to normals, but rate their impact as being relatively more negative.

Support for a Cognitive Theory of Hypochondriasis

Interest in the relation between emotion and cognition has dramatically increased over the last decade. Cognitive distortions have been hypothesized to either directly contribute to or act as a moderating variable in the etiology and maintenance of disorders such as anxiety and depression. In addition, cognitive-based treatments have formed the basis of successful interventions for emotional disturbances (e.g., Beck, Rush, Shaw, & Emery, 1979). Since cognitive approaches have been successful with what have been traditionally termed as disorders of mood, such an approach would seem especially suited to a disorder like hypochondriasis, whose primary diagnostic features emphasize cognitive excesses and distortions such as preoccupations, false beliefs, irrational fears, and misinterpretations. Indeed, the most widely used interventions for hypochondriasis recommend the use of either "common-sense" based reassurances to allay irrational fears, or cognitive/cognitive-behavioral strategies to more vigorously attack distorted beliefs (e.g., Barsky, Geringer, & Wool, 1988; Kellner, 1986).

Several investigators have used questionnaires (e.g., Kellner & Schneider-Braus, 1988) and factor analysis (e.g., Pilowsky, 1967; Bianchi, 1973) to examine the beliefs and attitudes of hypochondriacal subjects and compare their responses to other

clinical populations and normals. The results of these studies suggest that hypochondriacs think about and perceive illness differently from other people. For example, Kellner and his associates (1987) found that hypochondriacal patients report more fears of and false beliefs about disease, greater attention to bodily sensations, more fears about death, and greater utilization of medical care than general medical patients or normal controls. Their hypochondriacal subjects also reported greater distrust of their physicians and more health-risk behaviors. Barsky and Wyshak (1989) have documented that hypochondriasis is positively related to several health-related attitudes and concerns, such as amplification of bodily sensations, fears of aging and death, and a sense of bodily vulnerability.

While supportive of cognitive theories of hypochondriasis, questionnaire studies such as these provide only a descriptive account of self-reported beliefs and attitudes. It remains unclear whether the purported interpretive and attentional biases in hypochondriasis actually exist (Hitchcock & Mathews, 1992). As has been extensively argued elsewhere (e.g., Williams, Watts, MacLeod, & Mathews, 1988), self-reported differences in beliefs and attitudes cannot be taken as unequivocal evidence of the underlying cognitive processes. Such reports may reflect demand effects, or "common-sense" theories developed in retrospect to explain behavior or feelings. Subjects may in fact have very limited access to, or direct knowledge of, attentional and interpretive processes as they occur, especially if they are overlearned and automatic in nature,

rather than intentional and consciously controlled (Williams et al., 1988).

Furthermore, cognitive theories of hypochondriasis (Barsky & Klerman, 1983; Warwick, 1989) imply that hypochondriacs have specific attentional and interpretive biases toward physically-threatening information only. Questionnaire studies of hypochondriasis have typically failed to assess self-reported cognitive distortions in other domains, such as social threat. Complete understanding of this disorder may require the assessment of cognitive factors using objective, information processing tasks, and comparisons of the processing of illness related-cues to threatening information from other domains.

In the only study to date to employ objective assessment of cognitive distortions in hypochondriasis, Hitchcock and Mathews (1992) examined the interpretation of ambiguous bodily sensations in three experiments using separate samples of nonclinical subjects differing in level of hypochondriacal concern. In the first task, subjects directly reported their thoughts and interpretations about ambiguous bodily symptoms. The results suggested clear evidence of interpretive bias in the expected direction, in which subjects with high levels of hypochondriacal concern reported more catastrophic illness interpretations of ambiguous bodily sensations than subjects with low levels of hypochondriacal concern. The presence of an interpretive bias found further, conditional support in a task designed to be less demand-prone and transparent than self-report. Although individuals with high levels of hypochondriacal concern were

found to endorse significantly more threatening versions of previously heard ambiguous sentences than subjects with lower levels of hypochondriacal concerns, the high hypochondriacal subjects were equally likely to endorse physically and socially threatening versions.

In the final task, subjects were presented with sentences, some of which implied social or illness threats, and then asked to make a speeded decision about whether a word describing the inference had appeared in the sentence. The results from this task failed to support the hypothesis of an automatic inference bias. Overall, the results of these three studies (Hitchcock & Mathews, 1992) confirmed the existence of an interpretive bias toward threatening information, but cast doubt on the idea that this bias is always specific to illness cues, or that the interpretive process is completely automatic. Interestingly, the third study did indicate that subjects with high hypochondriacal concern were quicker to identify previously exposed illness words, suggesting a specific, enhanced sensitivity to illness-related information in hypochondriasis. Thus, it may be that selective attention to illness cues plays a role in the initiation or maintenance of hypochondriacal concern with bodily symptoms.

Attentional Bias

Selective attention, the differential processing of simultaneous sources of information, is the natural consequence of capacity limitations within the cognitive system (Williams et al., 1988). A number of studies suggest that this process may be biased in emotional disorders such that clinically anxious individuals

selectively attend to threatening information (e.g., Mathews & MacLeod, 1985). Increased perceptual salience for such material has been found to differentially affect the performance of clinically anxious patients, as compared to normals, on a variety of information-processing tasks (MacLeod, Mathews, & Tata, 1986). For example, the incidental presence of threatening stimuli has been found to influence the direction of attentional responses and to interfere with performance on ongoing tasks in anxious individuals (Mogg, Mathews, Bird, & Macgregor-Morris, 1990). While clinically anxious subjects appear to consistently shift attention toward threatening stimuli, non-anxious normals appear to shift attention away from such material (Williams et al., 1988).

Several lines of research suggest that a strong association exists between internally-focused attention and increased symptom reporting (for a review, see Cioffi, 1991). These include studies of self-awareness (e.g., Carver & Scheier, 1981), deficits in the external environment (e.g., Pennebaker, 1982), and pain distraction (e.g., Mullen & Suls, 1982). A hypochondriacal response is presumed by many (e.g., Barsky & Klerman, 1983) to reflect the selective deployment of attention to internal, physical sensations, as well as to illness-relevant cues in the external world, such as media reports of specific diseases. As noted previously, Hitchcock and Mathews (1992) have found evidence of increased salience for illness-related information in individuals with high hypochondriacal concern. This finding suggests the possibility that hypochondriacal subjects show an attentional bias similar to that found in anxiety patients, but

which is more specifically focused on illness cues. If so, then such an attentional focus could arise because of fears of illness, but could also enhance the perception and interpretation of symptoms, thus causing an increase in fear.

Bower's (1981) network model suggests that selective attention may be biased toward the encoding of mood-congruent material and that this bias should lead to increased perceptual salience for such material. Selective attention to threat cues in trait-anxious individuals appears to increase during manipulations of state anxiety or experimentally-induced stress (Williams et al., 1988). Broadbent and Broadbent (1988) suggest that this interaction between trait and state anxiety is a reliable effect. A similar interaction may occur in hypochondriacal patients such that attentional bias to illness-related threat cues may be potentiated during times of stress or dysphoric mood.

Experimental Methods. Several different information processing paradigms have been adapted for investigations of attentional bias in emotional disorders. The three most frequently used involve variations of the Stroop color-naming task (Stroop, 1935), the dot probe (MacLeod, Mathews, & Tata, 1986), and the attentional search task (Broadbent, Broadbent, & Jones, 1986). As utilized for investigations of attentional bias in anxiety, the Stroop color-naming task presents threatening and neutral words in varying colors and asks subjects to name the ink color of the words as quickly as possible while ignoring the meaning of the words. Slower color-naming in the presence of threatening, as opposed to neutral, words

suggests an attentional bias to threatening stimuli. In the dot probe experiment, word pairs are presented on a computer screen. The subjects' task is to read aloud the upper word in each pair and press a response key any time a small dot replaces one of the two words. Faster detection of the dot probe if it replaces a threatening word, as opposed to a non-threatening word, indicates attentional bias to threatening stimuli. The attentional search paradigm requires subjects to identify a neutral word target in the presence of two distractor words. Slower reaction times in the presence of threat distractors, as opposed to neutral distractors, suggests attentional bias to threatening stimuli.

Validity and Reliability of Experimental Methods. According to a recent review by Logan and Goetsch (1993), evidence of retest reliability has only been reported for the different Stroop methods. These reviewers also concluded that while discriminant validity has been demonstrated for all the experimental methods, construct validity has not. Basic questions have been raised over which of the experimental paradigms provide the most valid test of attentional bias. For example, the original Stroop test has been criticized as a poor test of selective attention (e.g., Treisman, 1969) because it presents targets (colors of words) and distracting stimuli (words) in identical areas of the visual field. Critics such as Fox (1993) argue that appropriate tests for selective attention require the to-be-attended and distracting information be presented in spatially separate locations (e.g., Fox, 1993). The dot probe and attentional search tasks meet this criteria and have demonstrated reliable

attentional biases in groups differing in their level of anxiety (Fox, 1992; MacLeod & Mathews, 1988; Mathews, May, Mogg, and Eysenck, 1990).

Although Mathews (1990) believes that only the dot probe paradigm directly measures attentional capture, Fox (1993) has argued that subjects can circumvent this attentional task with appropriate strategies. She suggests that modified Stroop tasks (e.g., those which employ masking) and the attentional search paradigm are better tests of the capacity to ignore distraction which appears outside the focus of attention. According to Mathews (1990), however, attentional bias can only be inferred from slower reaction times to distracting stimuli in the attentional search task. For example, a heightened negative affect due to exposure to threatening words rather than an attentional bias to threatening information may explain the performance interference in the attentional search task. While alternative explanations such as this cannot be completely ruled out, similarities between the results of the different attentional paradigms argue that the most parsimonious conclusion is that the interference effect is a function of attentional bias (Mathews, 1990).

It is important to note that information processing paradigms of selective attention have yet to establish at what point in the cognitive system selective biases are occurring (Fox, 1993). It may be that attentional selection processes only "early" or low-level perceptual features of stimuli, rather than "late" semantic meaning. Although recent evidence of interference from to-be-ignored stimuli

favours late over early selection accounts, subtle discrepancies in the basic cognitive literature have led some to propose hybrid models involving a flexible locus for visual selection (Yantis & Johnson, 1990). Debate will surely continue until this issue is resolved conclusively by empirical evidence. It is unlikely, however, that repetition priming of low-level perceptual features can account for the findings, because reliable attentional biases have been shown for anxious individuals under conditions where stimulus words are presented only once, as well as conditions in which word stimuli are repeated (Fox, 1993).

Specificity of Threat. Attentional specificity to threatening stimuli has been demonstrated across a number of anxiety-prone populations. Populations as diverse as subjects with PTSD (McNally, Kaspi, Riemann, & Zeitlin, 1990), spider phobia (Watts, McKenna, Sharrock, & Trezise, 1986), and social phobia (Hope, Rapee, Heimberg, & Dombek, 1990) have displayed interference effects specific to their areas of clinical concern. Furthermore, specificity to physically threatening stimuli has been demonstrated in a number of clinically anxious subjects, including those with panic disorder (Ehlers, Margraf, Davies, & Roth, 1988; McNally, Riemann, & Kim) and generalized anxiety disorder patients who reported worrying more about illness than social concerns (Mathews & MacLeod, 1985; Mogg, Mathews, & Weinman, 1989). Therefore, it is plausible to suggest that a disorder such as hypochondriasis, which is characterized by preoccupation with, and fear of, illness would be associated with a similar attentional interference effect to illness-related stimuli.

Relation to Perceived Risk. It is at least possible that enhanced sensitivity to illness-related information, however acquired, functions as a maintaining or exacerbating factor in hypochondriacal anxiety (Hitchcock & Mathews, 1992). If attention is repeatedly drawn to information relevant to illness, the availability of that information in memory will be enhanced, and the perceived risk of acquiring that disease increased (Lichtenstein, Slovic, Fischhoff, Layman & Combs, 1978). If particular bodily symptoms are believed to be typical of those associated with a feared disease, these symptoms may also come to attract special attention, and then be interpreted as confirming evidence of that disease via the representativeness heuristic (Kahneman, Slovic & Tversky, 1982). A bias in judgments of self-related future negative events specific to illness is consistent with clinical descriptions of hypochondriasis. Inflation of subjective health risk may motivate the well known hypochondriacal behaviors of doctor shopping, bodily checking and reassurance seeking.

Subjective Risk

Although misinterpretation of ambiguous physical sensations has received the most attention as the form of biased judgment responsible for hypochondriasis, only conditional support has been demonstrated for this cognitive distortion (Hitchcock & Mathews, 1992). It may be that a different form of judgmental bias, elevations of subjective health risk, may play a more central role in the production and maintenance of hypochondriacal anxiety. Subjective risk estimates involve probability judgments on the

likelihood of the occurrence of future events (e.g., that a Republican candidate will win the presidential election in 1996). Such judgments appear to be based upon the availability heuristic, or the ease with which examples of such events can be remembered or imagined (Kahneman, Slovic, & Tversky, 1982).

Systematic biases in judgment can be demonstrated in individuals when they make judgments concerning uncertain events, because availability is sometimes poorly correlated with actual frequency or probability (Rodin, 1978). Probability judgments can be influenced by manipulations of information salience (Kahneman et al., 1982). Evidence exists that emotional disorders, manipulations of mood, or experimentally-induced stress can also affect judgments of future risks (Williams et al., 1988). For example, Butler and Mathews (1983) found that anxious and depressed subjects rate negative events as more likely to happen than normal controls. The finding that subjective risk judgments are mood sensitive appears to be reliable (e.g., Bower, 1983).

According to Rodin (1978), attributional biases and the availability heuristic affect estimations of the likelihood of becoming the victim of a disease. The operation of health-related subjective risk bias in hypochondriacs, however, has yet to be investigated. Salovey and Birnbaum (1989) have demonstrated that probability estimates of future negative health-related events among normals is moderated by health status (which may affect availability) and mood. Inflation of subjective health risk may therefore increase

in hypochondriacs, especially in the presence of dysphoric mood or stress.

A Model of Hypochondriasis

It thus appears that a causal model may be postulated in which stress and depressed mood interact with the cognitive distortions of attentional bias to illness-related cues, and inflation of future negative health risk, to produce hypochondriacal concern. It has been argued, however, that important individual differences may underlie this process. Psychiatric patients, as opposed to normals, may process such information with dysfunctional schemas when negative mood states are activated (Teasdale, 1993). In such a model, the vulnerability underlying hypochondriacal concern would involve the activation of distorted illness-schemas. Thus, while stress or depression may increase innocuous symptom-reporting in normals, this process may be exaggerated in hypochondriacs and lead to abnormal illness behaviors.

Thus, the occurrence of a stressor, whether illness-related (e.g., illness of relative) or illness-irrelevant (e.g., argument with family member), may activate a negative mood state and produce changes in accessibility of congruent information. In hypochondriacal individuals, this may be distorted information about illness schematically arranged in memory. A health-related stimulus (e.g., newspaper report of new disease) may also directly prime this information. A change in availability may lead to the recall of mood-congruent memories, as well as selective allocation of attention in scanning the environment for congruent information. As argued

earlier, if attention is repeatedly drawn to information relevant to illness, then the availability of that information in memory will be further enhanced, and the perceived risk of becoming ill will be increased. This inflation of negative health risk then results in hypochondriacal concern. Although an empirical relationship has yet to be established between attentional bias and subjective risk, availability mediated by an association network (Bower, 1981) has been postulated as an underlying mechanism for both subjective risk judgments and selective allocation of attentional resources (e.g., Williams et al., 1988). The proposed model also allows the possibility of a circular process by which hypochondriacal concerns are maintained. The hypochondriacal fears may in turn become illness-relevant stressors themselves and lead to further priming of distorted illness information and increases in dysphoric mood, continuing the cycle.

Purpose of Study and Hypotheses

Although cognitive theories of hypochondriasis have generally proposed that selective attention and misinterpretation of bodily sensations are important etiological factors in hypochondriasis, little empirical research has been conducted on these cognitive distortions. The present study investigated attentional bias, as measured by an attentional search information processing paradigm, and biased judgment, as measured by subjective risk estimates of future events, in medical patients differing in levels of health anxiety, or hypochondriacal concern. Because the diagnosis of hypochondriasis depends upon the discrepancy between subjective and

objective health, level of hypochondriacal concern was controlled by physician ratings of global health status.

As cognitive theories imply that hypochondriacs have specific attentional and interpretive biases to illness-related information, the content-specificity of the proposed cognitive distortions were tested. Therefore, threatening stimuli from another domain were included in the attentional bias task and subjective risk estimates to determine if purported cognitive biases in hypochondriasis are specific to illness-related stimuli, or are only a manifestation of a more general sensitivity to all potential threats. Socially-threatening words were chosen as the contrast category because physical and social threat words are the most commonly contrasted content domains in investigations of attentional bias in anxiety (e.g., Fox, 1993; Hope et al., 1990; Mathews et al., 1990). In addition, because hypochondriacal concern has been linked in clinical lore and empirical research to interpersonal or emotional distress, it was thought that this contrast would provide the strongest test of the content-specificity hypothesis.

Therefore, the present study examined the hypothesis that hypochondriacal concerns are associated with a specific attentional bias for illness-related, as opposed to socially threatening, stimuli. Similarly, the study also examined whether hypochondriacal concerns were more strongly associated with an inflation of subjective risk in judgments of future negative events concerning health, as opposed to socially negative events. Past research has also indicated that experimentally-induced stress and dysphoric mood

are associated with cognitive distortions in trait anxious individuals. In addition, clinical lore, theory, and research suggest that hypochondriacal concern is associated with stress and exacerbated by depressed mood. Therefore, the present study tested the prediction that depressed mood would interact with illness-related cognitive distortions to produce hypochondriacal concern. The relation between hypochondriacal concern and minor life events was also examined.

In summary, by investigating cognitive processes in individuals differing in levels of hypochondriacal concern, the investigator attempted to answer the following questions:

1. Is self-reported hypochondriacal concern associated with attentional bias to illness-related cues, as opposed to socially-threatening cues? It was hypothesized that attentional interference from illness-related cues would predict significantly more variance in hypochondriacal concern than attentional interference from socially-threatening stimuli.
2. Is self-reported hypochondriacal concern associated with inflation of future subjective health risk? Based upon cognitive theories of hypochondriasis and studies of subjective risk, it was hypothesized that judgments of future negative health events would predict significantly more variance in hypochondriacal concern than judgments of future negative social events.
3. What is the relation among depression, cognitive distortions in attentional bias and subjective risk, and hypochondriacal concerns? It was also hypothesized that depressed mood would significantly

interact with attentional interference from illness-related cues in the prediction of hypochondriacal concerns. Similarly, it was hypothesized that a significant interaction would be obtained between depressed mood, and judgments of future health events in the prediction of hypochondriacal concerns.

4. What are the causal and directional influences of objective health status, stressful minor life events, depression, attentional bias to illness-related cues, and subjective risk of future health events on hypochondriacal concerns? An exploratory path analysis tested the proposed causal contributions of objective health status, minor life events, depressed mood, attentional bias, and subjective risk in the production of hypochondriacal concern.

METHODS

Subjects

Subjects were 200 adult volunteers recruited from 2 general medicine outpatient clinics at Earl K. Long Medical Center. This Southern hospital provides services for indigent patients, most of whom are between 16-65 years of age. Females comprise 64.7% of the patient population. A majority of patients are black (77.2%), while 21.5% are white and 1.3% are classified as "other". Inclusion criteria for the study were: if patients were between 21 and 65 years of age, if they had been registered at the clinic for at least one year, and if they granted access to their hospital medical records. Subjects were excluded from participation if they were illiterate, if they reported that they were unable to read the questionnaires (e.g., because of poor eyesight or because reading glasses were left at home), or if they reported having a terminal illness (e.g., cancer). Subjects having a physical disability which would have interfered with their ability to use a computer keyboard with both hands were also excluded from the study.

Measures

Demographic and Medical Status Questionnaire. This questionnaire was created to collect basic demographic information including age, gender, marital status, socioeconomic status, and other demographic variables on all subjects (see Appendix A). Three questions also asked subjects if they had ever been diagnosed with a life-threatening disease such as cancer, the reason for their

appointment at the clinic (e.g., routine check-up, current illness), and how long they had been enrolled at the clinic.

Physician Rating Scale. This rating scale was created to measure objective health status. It was adapted from procedures commonly used to rate health in studies of hypochondriasis (e.g., Barsky et al., 1986; Mabe et al., 1988). Although physician ratings based on this method provide some objective information pertaining to health status, they are at best only a measure of aggregate medical morbidity (Barsky et al., 1986). The scale asks physicians to rate a patient's global physical health using verbal anchors on a 7 point Likert-type scale, ranging from '0 - patient is in good physical health with a history of only routine minor illnesses' to '6 - patient has a terminal illness, death is imminent'. Rating scales such as this demonstrate adequate interrater reliability (e.g., Mabe et al., 1988). The rating scale is reproduced in its entirety in Appendix B.

Illness Attitude Scales (IAS). All subjects were screened with the Illness Attitude Scales (IAS: Kellner et al., 1987) to measure hypochondriacal concern. The IAS is a 29-item instrument designed to measure attitudes, fears, and beliefs associated with hypochondriasis. Based upon the factor analytic work of Pilowsky (1967) and Bianchi (1973), the IAS measures several commonly recognized components of hypochondriasis, including worry about illness, disease phobia, bodily preoccupation, and thanatophobia. The items are rated on a 5-point Likert-type scale and can be summed to yield a composite score ranging from 0 to 116. Kellner and his

associates (1987) report a test-retest reliability of .87 for the IAS. This measure has been shown to differentiate between patients with DSM-III diagnosed hypochondriasis and various other groups, including normal controls, other psychiatric patients, and general medical outpatients (Kellner et al., 1987).

Center for Epidemiological Studies Depression Scale (CES-D).

The CES-D (Radloff, 1977) was used to measure depressed mood. It is a 20-item self-report inventory which assesses the number and frequency of depressive symptoms experienced in the past week. The scale was designed to measure current level of depressive symptomatology with emphasis on the affective component, depressed mood (Rehm, 1988). Because only a small proportion of CES-D items address vegetative symptoms of depression, it is unlikely to be confounded with symptoms of physical illness in a medical population. The CES-D can be viewed as a measure of non-specific psychological distress as it also seems to measure anxiety and self-esteem (Orme, Reis, & Herz, 1986). The instrument has very good psychometric properties (Rehm, 1988) and extensive normative data are available (Lewinsohn & Lee, 1981). The CES-D has good internal consistency with alphas of roughly .85 for the general population and .90 for psychiatric populations. Split-half and Spearman-Brown reliability coefficients range from .77 to .92 (Radloff, 1977).

Weekly Stress Inventory (WSI). The WSI (Brantley & Jones, 1988) was used to assess minor life events. It is an 87-item self-report scale which lists minor stressful events that a person might experience throughout the week. Each item is rated on an 8-point

Likert-type scale, ranging from 0 ("did not happen") to 7 ("extremely stressful"). The measure yields an Event score (WSI-E), which is the total number of events endorsed, and an Impact score (WSI-I), which gives the sum of subjective ratings of distress for the events. Correlations of the WSI Event and Impact scores to their respective counterparts on the Daily Stress Inventory (Brantley & Jones, 1989) are .77 and .84 (Brantley & Jones, 1988). Principal components factor analysis of the WSI reveals one factor with an alpha coefficient of .95, suggesting that the items consistently measure the same construct of "stress".

Subjective Risk Questionnaire. This experimental instrument was derived from that developed by Butler and Mathews (1987) to assess subjective risk probabilities. The items have high face validity and directly ask subjects to make judgments concerning the probabilities of future events. The questionnaire does not purport to be a measure of a stable trait, and the respondents' judgments themselves constitute the data of interest. Therefore, standard psychometric measures of reliability are not usually reported for assessments of subjective probabilities (e.g., Bower, 1983; Johnson & Tversky, 1983; Salovey & Birnbaum, 1989). However, judgments of subjective risk have been demonstrated to change meaningfully with manipulations of priming and mood state among normals and emotionally disturbed individuals (Williams et al., 1988), consistent with theoretical interpretations in terms of availability.

For the current study, subjects rated 30 items on a 9-point scale in answer to the question "What is the probability that...?"

All items employed the 2nd person (e.g., "you") to assess subjects' personal probabilities. Half of the items referred to positive and half to negative events. To test the central hypothesis on the content specificity of cognitive distortions in individuals with hypochondriacal concern, ten of the items referred to health-related events, whereas ten other items referred to social-related events. The remaining ten filler items referred to financial events. The type and valence of items were presented in balanced order. (See Appendix C for the questionnaire.)

Attentional Bias Task

The attentional search task described by Mathews et al., (1990) was used to assess attentional bias. The task is supposed to measure the extent to which subjects can avoid distraction during a visual search. During the task, subjects are required to identify the target words "left" or "right" on a computer screen and to respond by pressing the appropriate button as rapidly as possible. For each trial, three fixation crosses are displayed in a vertical column, with the target replacing one of the crosses in any of the three positions. At the same time that the target is displayed, two distractor words appear simultaneously and replace the two remaining crosses in the vertical column.

Materials. Two categories of negative distractor words were used to test the main hypotheses of the attentional bias experiment: that hypochondriacal subjects would selectively attend to illness-related, as opposed to socially threatening words. Two categories of positive and neutral words were also included to control for baseline

reaction time and to balance the emotional valence of stimuli. To control for possible categorical priming effects in the positive and neutral items, words within these categories were semantically related. Thus, the distractor words comprised one of four semantic categories: neutral words representative of items commonly found in a house (e.g., bucket), positive words implying wealth or riches (e.g., diamond), negative words which are interpersonally- or socially-threatening (e.g., divorce), and negative words related to concerns about illness (e.g., symptoms of illnesses or names of diseases such as cancer).

Words used for the task were drawn from a large pool of items that were semantically related to the 4 categories described above. All words in the pool were between 4 and 7 letters long. So that degree of stimulus emotionality and threat could be controlled in forming categories, two panels of judges were asked to rate each word in the pool. The first 8-member panel was asked to rate each word on how threatening it was using a 7-point Likert Scale (0 - Extremely Threatening to 6 - Not at All Threatening). Similarly, a different panel of 8 judges was asked to rate each word on emotional valence using a 7-point Likert Scale (0 - Extremely Negative to 6 - Extremely Positive). Words were selected for the 4 previously described categories (neutral, positive, and the 2 negative categories) based upon these ratings.

A complete list of the 160 distractors actually used in the experiment is presented by category in Appendix D. The mean word length, frequency of usage, and judges' ratings for each category are

Table 1.

Word Categories by Mean Length, Frequency, and Ratings

	Illness	Social	Neutral	Positive
Length	5.30	5.60	5.58	5.63
Frequency	29.35	28.40	28.80	28.63
Rating				
Valence	1.48 ^c	1.54 ^c	3.33 ^b	4.35 ^a
Threat	3.33 ^b	3.65 ^b	5.84 ^a	5.58 ^a

Note. Within the valence and threat ratings, means with the same letter are not significantly different

presented in Table 1. An analysis of variance indicated that the words were equated such that there were no significant differences in word length across categories [$F(3,156) = 0.87, ns$]. Similarly, the words were also equated across categories [$F(3,156)=0.00, ns$] on frequency of usage in the United States based on norms provided by Francis and Kucera (1982). The words were also tested for readability with Grammatik IV (Reference Software International, 1989) which revealed that the average word in the distractor list was 1.42 syllables long, indicating that most readers could understand the vocabulary based on the criteria of syllables per word.

Analysis of variance indicated the expected pattern of significant differences across categories for judges' ratings on threat [$F(3,156)=175.47, p < 0.0001$] and valence [$F(3,156)=288.35, p < 0.0001$]. Multiple contrasts (see Table 1) revealed that the social and illness word categories were not significantly different on valence or threat ratings, suggesting that the judges viewed the words comprising these categories as equally negative and threatening. In contrast, the words comprising neutral and positive categories were rated as significantly different from the two negative categories, but not from each other, on the threat ratings. Finally, the judges rated the positive-rich word category as significantly more positive than the neutral category, which was rated as significantly more positive than the two negative categories. The words were assigned to one of two parallel forms that presented only one-half ($N=20$) of the 40 possible distractors from each of the 4 categories. Words within categories were equated

on mean word length, frequency, and threat and valence ratings across parallel forms.

Task. Subjects were seated in a sound-attenuated room in front of a color monitor controlled by a CompuAdd 286 computer programmed with Micro Experimental Lab (MEL) software (Schneider, 1988). The MEL software was programmed to log the response time and response accuracy of each response. Instructions for the task were presented on the computer. Subjects were asked to respond as quickly and as rapidly as possible on seeing the word "left" or "right", while ignoring any other words that appeared on the screen. The < and > keys on the computer keyboard were used to indicate "left" and "right" responses and were marked accordingly. Subjects were given instructions to press the < key with their left hand in response to the word left and to press the > key with their right hand in response to the word right. Practice trials with feedback on accuracy were given prior to presentation of the experimental trials to ensure that subjects understood task instructions.

Each trial began with the presentation of three fixation crosses arranged in a vertical column. Exact location of the crosses varied slightly on each trial to discourage subjects from staring at a fixed position on the screen. After a display of 500 ms, the three crosses were replaced by the target and two distractors from the same category. Subjects responded to the presentation of the words with a key press, which terminated the display. After a 500 ms blackout, followed by a "get ready" signal display for 500 ms, the next trial began. Display of target word (i.e., left or right) position was

completely randomized. The distractor pairs were presented in a fixed-random order, with each distractor pair appearing four times, twice with the target word "right" and twice with the target word "left". The two distractor words were also switched between the remaining upper and lower locations for the two presentations with each target word. Overall, 10 distractor word pairs in each of the 4 categories were presented four times for a total of 160 trials. Rest breaks were presented after every 40 trials.

Procedure

Consecutive adult attenders to the Earl K. Long Medical Center Family Practice Clinic and Walk-In Clinic were asked to volunteer for a study designed to examine the effects of attitudes and stress on health. In order to test literacy and vision as a control for performance on the attentional search task, volunteers were first screened with the Word Attack Subtest of the Woodcock-Johnson Psycho-educational Battery (Woodcock & Johnson, 1977). Individuals missing any word at the 6th grade reading level or who reported that they were having difficulty reading (e.g., because of uncorrected vision) were excluded from the study. Volunteers who met criteria for inclusion in the study were asked to sign an informed consent sheet (see Appendix E) that described the study, specified their rights as research participants, and granted the experimenters access to hospital medical records.

Subjects were then asked to complete the Demographic/Medical Status Questionnaire, the Illness Attitude Scale, the CES-D, the Weekly Stress Inventory, and the Subjective Probability

Questionnaire. Subjects then were randomly assigned one of the two parallel forms for the attentional bias task. After completing the task, subjects proceeded to their regularly scheduled appointment after which their personal physician completed the objective health status physician rating form. All subjects were paid \$5.00 for participating and debriefed after they completed the experimental tasks. A board-certified Family Practice physician with board-eligibility in Psychiatry and 15 years of experience in general medicine outpatient clinics later reviewed each subject's medical chart and completed a second physician rating form for each subject as a check for inter-rater reliability. The physicians were blind to the subjects' IAS scores, subjective risk estimates, and other experimental data.

RESULTS

Physician Ratings

The health status ratings made by the subjects' personal physicians at the time of their appointment and participation in the experiment were designated Physician 1 ratings, while the ratings resulting from the medical chart review were designated Physician 2 ratings. Both sets of ratings ranged from 0 to 5. Neither set of ratings utilized the number 6 point on the scale ("patient has a terminal illness; death is imminent"), indicating that the exclusion criteria were successful in screening out patients with illnesses which were immediately life-threatening. The rating sets had comparable averages, with a mean of 1.76 for Physician 1 ratings and a mean of 1.84 for Physician 2 ratings. The two rating sets were moderately correlated ($r = 0.53$, $p < .0001$). The modest discrepancy most likely resulted from the different processes by which the two ratings were made, one from a global impression by the patient's private physician during an actual medical appointment, the other from a careful review of the patient's medical chart. The physician ratings were averaged to reduce error variance and this combined physician rating was used in subsequent regression analyses to control for objective health status among subjects. The generalizability coefficient (Crocker & Algina, 1986) for the average of the two ratings was .69.

Sociodemographic Data

Descriptive statistics for the sample are presented in Table 2. The sample was composed mostly of females (87.5%), while the

Table 2.

Sociodemographic Data

Variable	N	%	Minimum	Maximum	Mean
Age	200		21	65	40.5
Sex	200	87.5 (female) 12.5 (male)			
Race	200	75.0 (black) 24.5 (white) 0.5 (other)			
Marital	194	64.9 (single) 35.1 (married)			
Education	199	39.2 (< 12 years) 36.2 (12 years) 21.6 (> 12 years) 2.5 (college grad) 0.5 (grad school)			
Income	176	77.3 (< 10,000) 15.9 (10-20,000) 3.4 (20-30,000) 1.7 (30-40,000) 0.6 (40-50,000) 1.1 (> 50,000)			

remaining 12.5% were males. Subjects ranged in age from 21 to 65 years, with a mean age of 40.5 years. A majority of the sample was black (75%), compared with 24.5% subjects who were white. An additional 0.5% described their race as "other". Approximately 65% of the subjects were single (either never married, divorced, or widowed), while 35% were married. Seventy-five percent of the subjects reported having completed some high school or having obtained a high school diploma. An additional 21.6% had some college or university hours. Only 3% of the sample reported having an undergraduate degree or advanced graduate/professional school training. Twenty-four percent of the subjects declined to indicate their income level. Of those subjects who responded, approximately 93% of the subjects reported income levels of \$20,000 per year or less, while 5.7% of the subjects reported yearly income between \$20,000 and \$50,000. Only 1.1% of the subjects reported income levels above \$50,000. Although the modal subject from this sample was female, black, poor, and relatively uneducated, the sample reflected the demographic trends of the patient population of the southern charity hospital where this study was conducted.

In order to examine the effects of the dichotomous demographic variables on the dependent variable of interest, hypochondriacal concern, three groups were formed based upon subjects' IAS scores and physician ratings. Subjects who obtained a combined physician rating above 2.0 were assigned to the "SICK" group (N=82). Among subjects with combined physician ratings of a 2 or less, those who scored at or below the median (i.e., 40) of the IAS were assigned to the

"NORMAL" group (N=66); while those who scored above 40 were assigned to the "HYPOCHONDRIACAL" group (N=52). Possible confounds between the demographic factors of sex, race, and marital status and the 3 groups differing on their level of objective health status and hypochondriacal concern were then tested with chi-square analyses.

The results indicated no significant differences between the observed and expected frequencies among the 3 groups on sex [$\chi^2(2)=0.60$, $p = .74$], race [$\chi^2(2)=5.39$, $p = .07$], and marital status [$\chi^2(2)=2.02$, $p = .37$]. Furthermore, age and hypochondriacal concern were not correlated ($r = -.02$, ns). Because of the restricted range of education and income levels in the sample, the association between hypochondriacal concern and these two demographic variables were not tested. In light of these findings, none of the sociodemographic variables were included in subsequent analyses.

Descriptive Statistics and Correlations of Experimental Data

Descriptive statistics of the experimental variables are presented in Table 3. Illness Attitude Scales global mean scores ranged from 6 to 85 with a mean of 41.33 and standard deviation of 14.8. This mean is higher than that reported by Kellner and his associates (1987) for groups of randomly selected family practice patients (29.6), psychiatric patients (24.0), and employee controls (17.5), but lower than that reported for a group of hypochondriacal patients who met DSM-III-R criteria for the disorder (61.7).

Correlations between the IAS and experimental variables are reported in Tables 4 and 5. Consistent with other findings in the literature, the correlation between hypochondriacal concern as

Table 3.

Descriptive Statistics of Experimental Variables

Variable	Mean	Std	Minimum	Maximum
Illness Attitude Scales	41.33	14.8	6	85
Combined Physician Ratings	1.80	1.34	0	5
Center for Epidemiological Studies-Depression Scale	19.67	11.58	0	53
Weekly Stress Inventory Event Scores	28.95	18.42	0	87
Weekly Stress Inventory Impact Scores	92.95	83.48	0	492
Attentional Bias RTs				
Illness	1039.11	290.21	608	2708
Social-Threat	1032.21	293.60	626	2897
Positive-Rich	1029.25	281.13	622	2618
Neutral	1021.12	281.61	614	2854
Subjective Risk Ratings				
Illness	-1.00	13.25	-32	32
Social	-1.23	11.54	-26	26
Financial	-2.09	12.29	-38	30

Table 4.

Correlation Matrix of Experimental Variables
with Attentional Bias RTs

	IAS	PHY3	CES-D	WSI	Attentional Bias RTs			
					ILLNESS	SOCIAL	POSITIVE	NEUTRAL
IAS	1.00	0.13 .0751	0.42 .0001	0.34 .0001	0.15 .0380	0.16 .0332	0.14 .0587	0.15 .0367
Physician Rating		1.00	0.01 .8512	-0.12 .0870	0.24 .0009	0.25 .0005	0.24 .0010	0.24 .0009
CES-D			1.00	0.52 .0001	0.11 .1501	-0.11 .1269	0.10 .1936	0.15 .0385
WSI-Impact				1.00	0.01 .8968	-0.01 .8458	0.01 .9130	0.02 .7619
Attentional Bias RTs Illness					1.00	0.97 .0001	0.98 .0001	0.97 .0001
Social						1.00	0.97 .0001	0.98 .0001
Positive							1.00	0.97 .0001
Neutral								1.00

Table 5.

Correlation Matrix of Experimental Variables
with Subjective Risk Ratings

	IAS	PHY3	CES-D	WSI	<u>Subjective Risk Ratings</u>		
					Health	Social	Financial
IAS	1.00	0.13 .0751	0.42 .0001	0.34 .0001	0.20 .0044	0.10 .1629	0.18 .0100
Physician Rating		1.00	0.01 .8512	-0.12 .0870	-0.01 .9017	-0.10 .1572	-0.09 .1956
CES-D			1.00	0.52 .0001	0.13 .0685	0.09 .2141	0.03 .6924
WSI-Impact				1.00	0.01 .9232	0.12 .0797	0.07 .3254
Subjective Risk Ratings Health					1.00	0.49 .0001	0.50 .0001
Social						1.00	0.59 .0001
Financial							1.00

measured by the IAS and objective health status as measured by the combined physician ratings was not significant ($\underline{r} = .13, p < 0.08$). As expected, the CES-D had a larger zero-order correlation with the IAS scores than any of the other variables [$\underline{r} = .42, p < .0001$]. Because the correlation between the IAS and the WSI-Impact score ($\underline{r} = 0.33, p < 0.0001$) was larger than the correlation between the IAS and the WSI-Event score ($\underline{r} = 0.24, p < 0.0005$), the WSI-Impact score was used in the subsequent regression analyses predicting hypochondriacal concern. None of the correlations between any of the subjective risk estimates or attentional reaction times (see Table 6) were significant.

Analyses of Attentional Bias Reaction Times

Only the reaction times (RTs) of 188 subjects were used in the attentional bias results. RTs for three subjects were lost as a result of hardware failure. One subject withdrew from the study prior to completing the attentional bias task. An additional eight subjects had less than a 90% accuracy rate on the attentional bias task, suggesting global inattentiveness, so their RTs were deleted from analysis. Given the nature of raw RT data, most researchers employ some technique to eliminate outliers, such as the use of median scores and trimming. The most popular technique involves elimination of all points beyond some criterion (Bush, Hess, and Wolford, 1993). Therefore, reaction times were filtered to exclude outliers less than 100 milliseconds (as probable anticipation errors), or more than three standard deviations above the mean for all responses (attributed to inattentiveness). Mean RTs were then

Table 6.

Correlation Matrix of Attentional Bias RTs
and Subjective Risk Ratings

	<u>Attentional Bias RTs</u>				<u>Subjective Risk Ratings</u>		
	Illness	Social	Positive	Neutral	Health	Social	Financial
Attentional Bias							
Illness	1.00	0.97 .0001	0.98 .0001	0.97 .0001	0.06 .3792	0.03 .6823	-0.02 .7901
Social		1.00	0.97 .0001	0.98 .0001	0.06 .4410	0.04 .6030	-0.02 .7447
Positive (Rich)			1.00	0.97 .0001	0.06 .4136	0.02 .7969	-0.03 .6578
Neutral				1.00	0.07 .3397	0.03 .7253	-0.02 .7363
Subjective Risk Ratings							
Health					1.00	0.49 .0001	0.50 .0001
Financial							1.00

recalculated for each condition for each subject. The global mean RTs for the four word categories across all subjects were in the expected pattern (see Table 3, p. 48), with RTs fastest for the neutral words (1021 ms) and slowest for the two negative word categories: illness (1039 ms) and social-threat (1032 ms). The mean RT for the positive rich word category attained an intermediate position at 1029 ms. The four RTs were highly correlated, ranging between .97-.98 (see Table 4, p. 49). The combined physician ratings were moderately correlated with all four RT word types, indicating that a general slowing in reaction time was associated with poorer health status.

Exploratory Stepwise Regression with Attentional Bias RTs. To test the main hypotheses concerning threat specificity in attentional bias, the RTs for illness and social threat words were entered into an exploratory stepwise regression, along with the CES-D and WSI scores, to predict hypochondriacal concern as measured by the IAS after controlling for objective health status and neutral reaction time. The interaction term combining CES-D and the illness RT mean was also included among the variables to be stepped in to test the hypothesis that an interaction between attentional bias to illness cues and mood would significantly predict hypochondriacal concern. A power analysis for the above regression indicated that for 188 cases and seven predictor variables, the probability of detecting the extent to which each of the IVs made a unique contribution to the dependent variable [estimating f^2 at $.04/(1-.35) = .062$] was approximately 70 per cent (for $\alpha = .05$, $L = 11.16$).

Table 7.

Summary of Variables Entered in Stepwise Regression
Predicting Hypochondriacal Concern Using Mean RTs

Variable Entered	Removed	Step	Partial R^2	Model R^2	F	P
Physician Rating		0				
Neutral RT		0	0.03	0.03	3.21	0.0426
CES-D		1	0.16	0.20	37.67	0.0001
WSI-Impact		2	0.03	0.23	6.55	0.0113
Social RT		3	0.01	0.24	2.75	0.0990
	Social RT	4	0.01	0.23	2.75	0.0990

Note. Illness RT and the interaction term did not meet criteria for entry into the model.

The results of the stepwise regression are presented in Table 7. The combined physician rating and neutral RTs were entered into the regression, resulting in an R-square of 0.03 [$F(2,185)=3.21$, $p < 0.05$). With the significance level for entry into the model set at 0.15, the CES-D scores stepped in first and predicted 16% incremental variance [$F(3,184)=37.67$, $p < 0.0001$], while WSI scores entered second and predicted 3% incremental variance [$F(4,183)=6.55$, $p < 0.02$]. Although the social threat mean RTs entered next, it was not significant at the .05 level and was therefore deleted. Neither the illness RT mean or the interaction term met criterion for entry into the model. The overall model predicted 23% of the variance in IAS scores [$F(4,183)=13.32$, $p < 0.0001$].

In light of the intriguing pattern of results of the stepwise regression, a decision was made to re-analyze the data with a trimming procedure suggested by Bush and her associates (1993). Using Monte Carlo simulations, these investigators tested the ability of different types of transformations to improve power in within-subject designs employing reaction time data. Their results clearly indicated that trimming was more effective than eliminating all points beyond a criterion. The trimming technique which they used, eliminating the highest and lowest score for each subject in each condition, was superior to criterion elimination with both normally distributed and skewed data. Furthermore, this technique was not found to increase the probability of a Type I error (Bush et al., 1993).

Therefore, the highest and lowest RT scores from each of the 4 word types for each subject were eliminated. The means were recalculated and the results are presented in Table 8. The global trimmed means show a slightly different pattern of results from the original means. Although the mean RTs for the illness words were again the slowest (1033 ms), the social-threat RTs and positive-rich RTs means were equivalent (1022 ms). The neutral RTs were fastest (1013 ms). The trimmed RT data were entered into a stepwise regression predicting hypochondriacal concern as described above.

The combined physician ratings and the neutral RTs were entered, resulting in an R-square of .03 [$F(2,185)=2.88$, $p < 0.06$]. CES-D scores stepped in first [$F(3,184)=38.02$, $p < 0.0001$] and predicted an additional 17% of the variance, followed by WSI scores [$F(4,183)=6.53$, $p < 0.02$] which predicted 3% of incremental variance. The trimmed mean RT for social words entered last [$F(5,182)=6.06$, $p < .02$] and also predicted 3% additional variance. Neither the trimmed mean illness RT nor the interaction term met the 0.15 criterion level for entry into the model. The overall model predicted 25% of the variance in IAS scores (see Table 9).

Analyses of Subjective Risk Estimates

Descriptive statistics of the positive, negative, and total subjective risk ratings for the future health, social, and financial events are presented in Table 10. Total rating scores for each domain were created by adding the ratings (on a 0 to 8 scale) for the 5 future positive events and the 5 future negative events. The ratings for the negative events received negative signs. The total

Table 8.

Trimmed Reaction Times for Word Categories

	Mean	Std	Minimum	Maximum
Illness RT	1033 ms	304 ms	606 ms	3014 ms
Social RT	1022 ms	292 ms	623 ms	2940 ms
Positive RT	1022 ms	290 ms	621 ms	2848 ms
Neutral RT	1013 ms	295 ms	613 ms	3246 ms

Table 9.

Summary of Variables Entered in Stepwise Regression
Predicting Hypochondriacal Concern Using Trimmed Mean RTs

Variable Entered	Step	Partial R^2	Model R^2	F	P
Physician Rating	0				
Neutral RT	0	0.03	0.03	2.88	0.0589
CES-D	1	0.17	0.20	38.02	0.0001
WSI-Impact	2	0.03	0.22	6.53	0.0114
Social RT	3	0.03	0.25	6.06	0.0147

Note. Illness RT and interaction term did not meet criteria for entry into the model.

Table 10.

Mean Positive, Negative, and Total Subjective Risk Ratings
By Domain

	Mean	Minimum	Maximum	STD
Health Positive	14.45	0	40	7.79
Health Negative	-15.45	0	-36	8.75
Social Positive	14.33	0	40	8.67
Social Negative	-15.56	0	-37	8.14
Financial Positive	13.31	0	36	8.09
Financial Negative	-15.40	0	-40	9.02
Health Total	-1.00	-32	32	13.25
Social Total	-1.23	-26	26	11.54
Financial Total	-2.09	-38	30	12.29

ratings could therefore range from -40 to +40 with a "0" indicating that subjects rated future negative events and future positive events as equally likely to occur.

The total mean scores for all 3 domains were negative, indicating that subjects in general rated future negative events as slightly more likely to occur than positive events. Correlations between the total subjective risk estimates and the other experimental variables were presented in Table 5 (see p. 50). The intercorrelations among subjective risk ratings ranged from .49 - .59 ($p < .0001$). Contrary to expectations, the correlations between the total subjective risk scores for the 3 domains and hypochondriacal concern were positive (illness $r = .20$, $p < .01$; social $r = .10$, ns; financial $r = .18$, $p = .01$). The same was true of the correlations between the total subjective risk scores and level of depression (illness $r = .13$, ns; social $r = .09$, ns; financial $r = .03$, ns.). This indicates that subjects tended to rate positive future events as more likely to happen than future negative events as hypochondriacal concern and depression increased.

Exploratory Stepwise Regression with Subjective Risk Ratings.

To test the hypothesis that inflation of future negative health risk would predict hypochondriacal concern, the relations among hypochondriacal concern, mood, stress, and subjective risk were also assessed with multiple regression. Scores from the CES-D, WSI-Impact scores, subjective risk ratings for future health and social events, and the interaction between depression and future health risk probabilities were used to predict hypochondriacal concern as

measured by IAS scores in an exploratory stepwise regression, after controlling for objective health status as measured by the combined physician ratings. The specific purpose of the analysis was to: 1) test the content specificity hypothesis by determining whether increased subjective risk for negative health outcomes would predict significantly more of the variance in hypochondriacal concern than subjective risk estimates for negative social outcomes; and 2) whether mood would significantly interact with subjective risk estimates for health outcomes in predicting hypochondriacal concern. Power for this analysis to detect the unique contribution of each IV (200 cases, six predictor variables, $L = 11.97$, $\alpha = .05$) was determined to be approximately 75 per cent.

The combined physician ratings were entered (see Table 11) and produced a Multiple R of .2 [$F(1,198)=3.20$, $p < .08$]. With the significance level set at 0.15 for entry into the model, CES-D scores stepped in first and predicted 17% incremental variance [$F(2,197)=41.97$, $p < 0.0001$]. WSI scores stepped in second and predicted 3% incremental variance [$F(3,196)=6.72$, $p < 0.02$]. The subjective risk scores for future health events entered next [$F(4,195)=6.70$, $p < 0.02$] and predicted 3% incremental variance, while the interaction term entered last [$F(5,194)=3.90$, $p < 0.05$] and predicted an additional 3% in incremental variance. The subjective risk ratings for future social events failed to meet criterion for entry into the model. The full model predicted 26% variance in IAS scores [$F(5,194)=13.40$, $p < 0.0001$].

Table 11.

Summary of Variables Entered in Stepwise Regression
 Predicting Hypochondriacal Concern Using Subjective Risk Ratings

Variable Entered	Step	Partial R^2	Model R^2	F	P
Physician Rating	0	0.02	0.02	3.20	0.0751
CES-D	1	0.17	0.19	41.97	0.0001
WSI-impact	2	0.03	0.22	6.72	0.0102
Ratings for Future Health Events	3	0.03	0.24	6.70	0.0103
CES-D X Ratings for Future Health Events	4	0.02	0.26	3.90	0.0497

Examination of the parameter estimates revealed that the main effect for subjective risk estimates of future health events in predicting hypochondriacal concern was positive, similar to that of the zero-order correlation. This indicated that as hypochondriacal concern increased in the sample, positive future health events were rated as more likely to happen than negative events. The significant interaction term suggested that the regression of hypochondriacal concern on predictions of future health events varied with level of depression. Interestingly, the parameter estimate for the interaction term between ratings of future health events and depression was negative.

To clarify the interaction, separate regressions were performed for subjects differing on level of depression, based upon a median split of the CES-D scores. Among subjects scoring less than 17 on the CES-D, ratings of future health events predicted 18% incremental variance in hypochondriacal concern after controlling for objective health status [$F(2,93)=11.95, p < .001$]. The parameter estimate was positive for this regression. Among subjects scoring 17 or higher on the CES-D, however, the linear regression of hypochondriacal concern on predictions of future health events was practically nonexistent. After controlling for objective health status, predictions of future health events accounted for less than .01 incremental variance in hypochondriacal concern [$F(2,101)=0.11, ns$] among depressed subjects.

Additional Analyses of Subjective Risk Ratings. In order to better understand the different relations between hypochondriacal concern and ratings of future health events among depressed and

Table 12.

Total Mean Subjective Risk Ratings for Illness Events
of HYPO Group by CES-D

	Sick	Normal	Hypochondriacal
Low CES-D	-5.31	-3.15	9.60
High CES-D	0.72	-0.90	-0.14

nondepressed subjects, an ANOVA was performed to further analyze the subjective risk ratings. To do this, the 3 previously described HYPO (normal, sick, hypochondriacal) groups created to rule out possible confounds with sociodemographic variables were used. The HYPO groups were further divided by median split on their CES-D scores to compare subjective risk ratings of future health events (see Table 12).

The analysis of variance revealed a significant main effect for HYPO [$F(2,194)=2.87, p < .02$], but the main effect for DEPRESSION was not significant [$F(1,194)=0.35, ns$]. The interaction term, however, was significant [$F(2,194)=5.33, p < .01$]. For both normal and sick subjects, ratings of future positive illness events were rated as more likely among those who were depressed than those who were not. This pattern was reversed in the hypochondriacal subjects. Depressed hypochondriacal subjects rated future negative events as more likely to occur than future positive events compared to nondepressed subjects with hypochondriacal concern.

Path Analysis

The path analysis proposed for this project was performed to explore the direct and indirect contributions of objective health status, minor life events, dysphoric mood, attentional bias to illness stimuli, and subjective risk for future health events in their hypothesized relation with hypochondriacal concern as measured by IAS scores. The proposed causal model is presented in the path diagram in Figure 1. The model tested in the path analysis was recursive, testing the flow of causality in one direction only. The model was also just identified, meaning that each variable in the

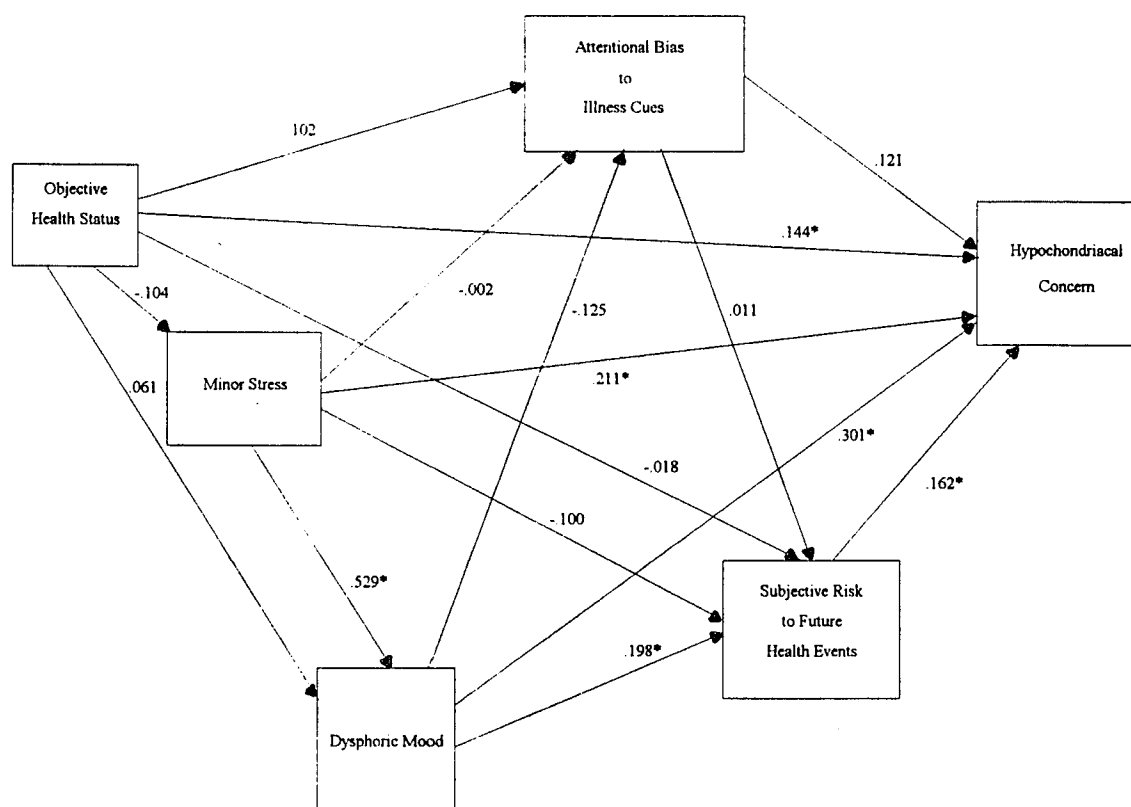


Figure 1.

Path diagram of proposed causal model of hypochondriasis (N=188)

Table 13.

Path Analysis of Combined Physician Ratings, Weekly Stress,
Depression, Attentional Bias to Illness, and Subjective Risk to
Future Health Events on Hypochondriacal Concern (N=188)

	<u>r</u>	direct	indirect
Physician Ratings	.135	.144*	.005
Weekly Stress	.344*	.211*	.143*
Depression	.420*	.301*	.017
Attentional Bias	.080	.121	.002
Subjective Risk	.205*	.162*	-

Note. * indicates $p < .05$

model was hypothesized to have an effect on every later endogenous variable in the proposed path. Each variable was therefore regressed on all antecedent variables in the model. To control for baseline reaction time, linear regression was used to create a weighted difference score of the trimmed illness reaction times by removing its shared variance with the trimmed neutral reaction times.

Path coefficients are the estimates of the direct effect of a variable on the variable which it is assumed to cause. These coefficients may be interpreted in much the same manner as standardized beta weights in multiple regression. The path coefficients for the proposed causal model are presented in Figure 1. Table 13 also presents the direct and indirect effects of objective health status, weekly stress, depression, attentional bias to illness stimuli, and subjective risk for future health events on hypochondriacal concern. Objective health status, weekly stress, depression, and subjective risk ratings for future health events all had significant direct effects on hypochondriacal concern, with the direct effect of depression being the largest. The direct effects of attentional bias on subjective risk and hypochondriacal concern were not significant. Of all the variables in the model, only weekly stress had a significant indirect effect on hypochondriacal concern.

Additional Analyses. The path analysis failed to support attentional bias to illness stimuli as an important contributor to hypochondriacal concern. Although objective health status was statistically controlled for in the path analysis, it may be that attentional bias to illness stimuli is discontinuous across healthy

subjects with hypochondriacal concern, and sick individuals with legitimate reasons to be worried about their health. In order to assure that the relation between hypochondriacal concern and attentional bias to illness words was not being masked by subjects who had actually had a serious illness, an additional path analysis was performed after deleting the data of the 78 subjects (out of the 188 subjects with reaction time data) who had combined physician ratings greater than 2 (indicating poorer objective health status). This left 110 relatively healthy subjects for this analysis.

The exclusion of the sick subjects reduced the range of physician ratings and limited the causal impact of objective health status on the subsequent variables in the model. The path was therefore performed again with only the weekly stress scores, the depression scores, the weighted difference scores for the illness attentional bias reaction times, and the subjective risk ratings for future illness events. As before, the model was recursive and just-identified. The hypothesized path model and path coefficients are presented in Figure 2. Table 14 presents the direct and indirect effects of the variables in the proposed causal model.

The removal of individuals with a serious illness from the sample produced major changes in the path coefficients of the model such that the direct effects of weekly stress and subjective risk, as well as the indirect effect of weekly stress, were no longer significant. The decline of the casual impact of subjective risk was undoubtedly due to its previously discussed complex, nonlinear interaction with depression and hypochondriacal concern.

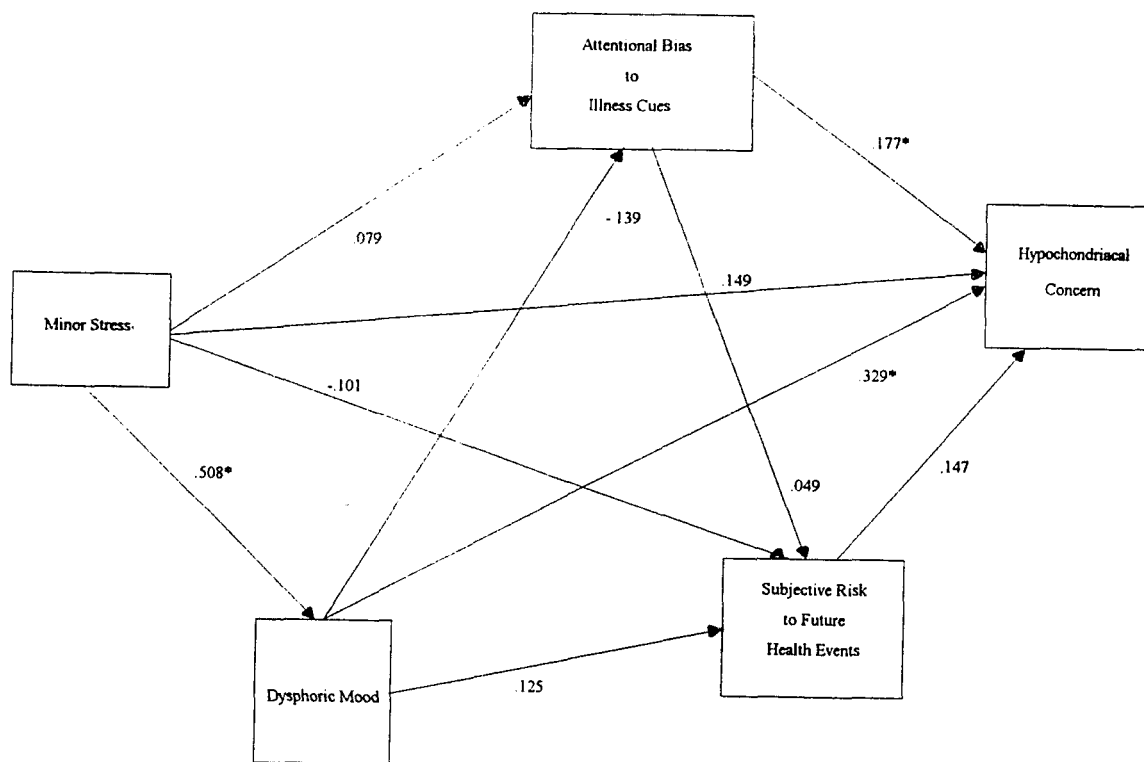


Figure 2.

Path diagram with non-sick subjects (N=110)

Table 14.

Path Analysis of Weekly Stress, Depression, Attentional Bias to
Illness, and Subjective Risk to Future Health Events on
Hypochondriacal Concern in Non-Sick Subjects (N=110)

	<u>r</u>	direct	indirect
Weekly Stress	.312*	.149	.166
Depression	.397*	.329*	-.007
Attentional Bias	.120	.177*	.006
Subjective Risk	.170	.147	-

Note. * indicates $p < .05$

Interestingly, the only variables which had significant direct effects on hypochondriacal concern were depression and attentional bias. Furthermore, most of the impact of depression and attentional bias on hypochondriacal concern was direct, that is, not mediated by any of the other measured variables. It thus appears that the direct effect of attentional bias on hypochondriacal concern occurred independently of depressed mood and the other measured variables in the sample of non-sick subjects.

This analysis, although suggestive that attentional bias to illness cues contributes to hypochondriacal concern in individuals who do not have a serious illness, did not resolve the issue of whether or not the effect is more important than that of attentional bias to socially threatening stimuli. To test this, a final stepwise regression was performed with the data from the 110 non-sick subjects using CES-D scores, WSI-Impact scores, and weighted difference scores for both the illness and social reaction times (in which their shared variance with baseline neutral reaction time was removed) as predictors. The CES-D scores stepped in first and predicted approximately 16% of the variance in IAS scores [$F(1,108)=20.25$, $p < .0001$]. The attentional bias weighted difference score for social reaction times stepped in and accounted for 3% incremental variance [$F(2,107)=4.45$, $p < .05$]. Although the WSI-Impact scores were entered in the third step [$F(3,106)=2.16$, $p < .15$], it was later removed from the model. The weighted difference score for illness reaction times did not meet the .15 criterion for entry into the model. Although the second path analysis suggested that illness RTs,

when not in competition with social RTs, will predict a significant amount of variance in hypochondriacal concern in non-sick subjects, the social RTs continued to account for relatively more variance in hypochondriacal concern than the illness RTs when both variables were included in the same regression.

DISCUSSION

The present study was designed to investigate attentional bias to illness-related stimuli, as inferred from the reaction times in the presence of illness distractors on the attentional search task, and inflation of subjective risk for future negative health events, as measured probability judgments, in hypochondriacal concern. Theory and clinical lore suggest that attentional bias to illness-related stimuli and increased subjective risk for future negative health events are etiologically related to hypochondriacal concern. The results, however, generally failed to support the hypotheses that illness-specific cognitive distortions would predict hypochondriacal concern in this sample of medical outpatients.

Summary of Attentional Bias Analyses

The results of the stepwise regression with the attentional bias RTs failed to confirm the specificity hypothesis that attentional bias to illness stimuli would predict a significant amount of variance in hypochondriacal concern, either as a main effect or in interaction with depressed mood. It should not be assumed, however, that the attentional bias task itself was insensitive with this sample of subjects, given the findings with the socially threatening words. The trimming procedure apparently decreased within subject variance in the RTs and enabled the social threat RTs to meet criterion for entry into the model.

The failure to find attentional bias to illness cues was surprising. Recent research has suggested that attentional bias to threatening stimuli is specific to an individual's clinical concerns.

This specificity to threat has been demonstrated, for example, in social phobics with socially-threatening words (Hope et al., 1990), and PTSD-disordered war veterans with combat-related words (McNally et al., 1990). Therefore, it was hypothesized that hypochondriacal concern would be associated with attentional bias to illness words, as opposed to socially-threatening words. Results of the stepwise regression with all subjects, however, indicated that attentional bias to socially threatening words predicted more variance in hypochondriacal concern. Once sick subjects were removed from the sample, a path analysis supported the hypothesis that attentional bias to illness cues does have a causal impact on hypochondriacal concern. A final stepwise regression, however, indicated that RTs to illness words still accounted for less variance in IAS scores than RTs to social threat words.

Failure to find a specific attentional bias to illness cues might have been caused by a lack of subjects with DSM-III-R hypochondriasis. In a recently published review of attentional bias research, Logan and Goetsch (1993) concluded that the specificity effect tended to be found only in DSM-III-R diagnostic groups, while analogue or subclinical groups displayed attentional bias to general threat. For example, in the surveyed 14 studies employing anxiety-disordered subjects that attempted to determine whether attentional bias was to specific or general threat cues, 11 found attentional bias to specific, personally relevant threat cues. Studies with nonclinical subjects with high trait anxiety, however, typically have found greater attentional bias toward general than specific threats.

While it was hoped that the fairly large sample of medical patients would include some individuals whose hypochondriacal concern was in the clinical range, limited resources did not permit subjects to be diagnosed psychiatrically. Even for those subjects with high IAS scores and low physician ratings, it cannot be assumed that they met the criteria for the DSM-III-R diagnosis of hypochondriasis. At best, they can only be viewed as lying in the upper range of the continuum of subclinical hypochondriacal concern. The final path analysis and stepwise regression with non-sick subjects indicated that attentional bias to illness and social cues both contributed to hypochondriacal concern. This suggests that a general sensitivity to all threatening stimuli, rather than illness cues alone, was linked to subclinical levels of hypochondriacal concern in this sample, consistent with the findings of the Logan and Goetsch review.

The consistent superiority of the RTs to social threat words over RTs to illness words in predicting hypochondriacal concern, however, remains puzzling. The intriguing findings might indicate that social distress plays a contributing role in abnormal illness concerns, consistent with speculations that hypochondriacs express emotional problems in somatic terms. Such conjectures, however, are purely post hoc and tempered by the fact that the social threat RTs only accounted for 3% of the variance in IAS scores. A more parsimonious explanation is that subjects with extremely high levels of hypochondriacal concern also had significant social concerns.

The sociodemographics of the sample suggest that the study participants faced enormous social and economic stressors. Research

indicates that psychopathology is prevalent among patients attending low-income, inner-city medical clinics (e.g., Miranda & Dwyer, 1993). As many as 65% of the medical outpatients at the hospital where this study was conducted, for example, meet criteria for at least one DSM-III-R diagnosis (Adams, 1993). Indeed, the average CES-D scores (19.67) and WSI scores (Event - 29.95, Impact - 92.95) of the present sample indicates moderate to severe levels of depression and stress. It is conceivable that the ability of the social threat RTs to predict hypochondriacal concern may have resulted from comorbid anxiety or depression related to social distress.

Another possible explanation for the failure to find illness-specific cognitive distortions is that the hospital environment used to locate subjects may have unintentionally biased the results. Given that the subjects were tested in a medical setting while awaiting a medical appointment, it may be that the experimental conditions primed illness concepts among all subjects, thus erasing any pre-existing differential sensitivity to illness cues that might have existed among them. It seems reasonable to propose that different results may have been obtained in a neutral setting. Therefore, the present failure to find evidence of a specific attentional bias to illness cues must be regarded as inconclusive.

Summary of Subjective Risk Analyses

Although the subjective risk estimates for future health events and its interaction with depression in predicting hypochondriacal concern were significant, together they only accounted for a modest 6% of the variance in hypochondriacal concern. Furthermore, the

regression was in the opposite direction from that which was hypothesized in that subjects apparently rated future positive health events as more likely to occur than future negative health events as their level of hypochondriacal concern increased. The significance of the interaction term, however, suggested that an important conditional relation existed in the data. When groups differing in level of depression were compared, the trend for positive health events to be rated as more likely to occur than negative health events as hypochondriacal concern increased was only found among nondepressed subjects. Subjective risk scores for future health events did not predict any appreciable amount of variance among subjects who were depressed.

The originally proposed stepwise regression failed to support the hypotheses that hypochondriacal concern would be associated with an inflation of perceived risk for future negative health events, and that the relation would be magnified among depressed individuals. It appears, however, that the use of linear regression analysis obscured the complex interactions among subjects with extreme levels of hypochondriacal concern. Depressed mood did apparently interact in a unique way with abnormal illness concerns when individuals scoring in the upper ranges of hypochondriacal concern contemplated the future. An unplanned, post hoc ANOVA indicated that hypochondriacal subjects did rate future negative health events as relatively more likely to occur when depressed, but sick and normal subjects who were depressed rated future positive health events as more likely to occur. The opposing trends were cancelled out in the regression. This suggests

that different results may be obtained in future investigations employing extreme groups. As in studies of attentional bias, all previously documented investigations of subjective risk have examined mean differences between groups (either between extreme scorers or between clinical patients and normals). It may be that the proposed cognitive biases of hypochondriasis involve qualitative differences, rather than quantitative differences which occur on a continuum.

The finding that positive health events were rated as more likely to occur as levels of hypochondriacal concern increased among the sample was unexpected and suggests the operation of an additional, unknown moderator variable. For example, the optimism of these subjects might reflect a defensive reporting bias resulting from social desirability. The complex interaction between depression and hypochondriacal concern in subjects' ratings of future health events also may have been due to a related, but somewhat different variable. Research (e.g., Davis & Schwartz, 1987) suggests that "repressors" (i.e., low anxious/high social desirability) inhibit the expression of negative emotional experiences because of an inaccessibility of affective memories. If availability does play a role in subjective risk, then repression may inhibit probability judgments of future negative events. Speculation such as this, of course, needs to be pursued in further research.

The failure to find support for the proposed attentional and subjective risk biases may also be attributed to the sociodemographic characteristics of the subjects. The sample for the present study was apparently very different in terms of their sociodemographic

make-up from the samples of college students and clinic patients which have been used in most previous studies of cognitive distortions. Although the present results might be dismissed as coming from an unrepresentative sample of medical patients in the United States, studies which employ low SES and minority populations are under-represented in the scientific literature. Further investigations of will be needed to determine whether the proposed cognitive biases of hypochondriasis are generalizable to minority and low-income samples.

It is entirely possible, for example, that the casual path to hypochondriacal concern might be very different among the economically and educationally deprived patients who participated in this study. Subclinical levels of hypochondriacal concern might be reinforced in low SES patients if medical settings offer a sympathetic forum for expressing and obtaining assistance for social and financial problems. Indeed, previous studies which have questioned the validity of hypochondriasis as a discrete diagnostic entity may have included a majority of subjects with comorbid depression or anxiety related to socioeconomic problems. Individuals such as these may be more likely to exhibit cognitive biases to social, or generally threatening stimuli. In contrast, DSM-III-R diagnosed hypochondriacs, who exhibit the classic features of irrational beliefs about illness, disease phobia, reassurance seeking, and doctor-shopping, may be more likely to exhibit illness-specific cognitive distortions.

Illness-specific cognitive distortions have been proposed to be etiologically related to hypochondriacal concern. Even if attentional bias to illness cues and inflation of subjective risk for future negative health events are eventually identified in DSM-III-R diagnosed hypochondriacs, the question of whether they are a cause or result of the disorder will remain. Given the results of the Logan and Goetsch review (1993), it may be that attentional bias to general threatening stimuli acts as a predisposing factor for hypochondriasis and the various anxiety disorders, but that threat-specific cognitive distortions develop as a result of psychopathology. It may take longitudinal research with subjects at risk for hypochondriasis to resolve this issue definitively. Regardless of how the cognitive biases may arise, however, it seems likely that they would operate as important maintaining factors through a circular relationship.

This project involved the first attempt to establish empirical evidence of a relationship between attentional bias and subjective risk. As noted previously, availability mediated by an association network has been postulated as an underlying mechanism for both selective allocation of attentional resources and judgments of subjective risk (e.g., Bower, 1981). The availability heuristic refers to the ease with which examples of events can be remembered or imagined. It was assumed that if attention is repeatedly drawn to information relevant to illness, then the availability of that information in memory will be enhanced, and the perceived risk of becoming ill will be increased. The results, however, failed to demonstrate an association between attentional bias to threatening

stimuli and judgments of subjective risk. This suggests that the two cognitive biases may operate independently of each other.

The lack of association also calls into question the concept of availability as an underlying factor for both attentional bias and subjective risk. McNally and his associates (1990) have proposed that availability is an insufficient explanation for attentional bias. They suggest that anxiety-disordered patients may instead have more difficulty deactivating threat concepts once they have been accessed. MacLeod and Mathews (1991) have also recently questioned the idea that availability is the important mediating factor for attentional bias and suggest that the phenomenon might be better explained by the differential assignment in the priority assigned to the processing of simultaneously available stimulus inputs.

Although the present study failed to support the hypothesis that individuals with hypochondriacal concern have specific cognitive biases toward illness cues, further investigations of attentional bias and subjective risk in hypochondriacal concern appear warranted. Future research, however, should employ subjects who explicitly meet the criteria for the DSM-III-R diagnosis of hypochondriasis compared to normals as well as individuals with subclinical levels of hypochondriacal concern. The magnitude of subjects' social concerns should be assessed and matched across groups so that any differential responses to social threat cues on information processing tasks can be placed in perspective. Perhaps most importantly, subjects should be tested in a neutral setting so that specific fears are not differentially activated.

Although cognitive theories of psychopathology have become very popular in the past decade, many have employed "lay" concepts of cognition (Teasdale, 1993). For example, if information processing concepts such as schemas and attentional bias are used to explain psychopathology, it is important to determine whether the proposed concepts represent the same phenomena as those studied by basic cognitive science. Otherwise, the theoretical integrity of cognitive clinical psychology could be compromised. By testing the hypothesized cognitive distortions with empirical methods derived from basic cognitive science, we can discover whether cognitive theories of psychopathology are valid or serve merely as "post hoc rationalizations when ad hoc clinical procedures seem to have worked" (Ross, 1991 cf Teasdale, 1993).

Paradigms borrowed from basic cognitive science may also yield benefits for clinical practice. The information processing tasks themselves may represent the crude beginnings of useful diagnostic techniques. In the near future, they may take their place alongside patient self-report, behavioral observation, and psychophysiological recordings in the multi-modal assessment of certain psychological disorders. Cognitive psychologists are also investigating strategies to debias specific cognitive distortions such as unrealistic subjective risk estimates in normals (e.g., Arkes, 1991). These may ultimately prove to be useful therapeutic strategies for psychologically-disordered patients. As cognitive factors are increasingly recognized as important factors in psychopathology,

research derived from basic cognitive science may help to advance the understanding and treatment of psychological disorders.

Conclusions

The present study of cognitive distortions among medical outpatients failed to provide support for theories which suggest that attentional bias to illness cues and inflation of subjective risk for future negative health events are associated with hypochondriacal concern. Several factors which may have contributed to the negative findings, such as a lack of subjects clearly meeting criteria for the DSM-III-R diagnosis for hypochondriasis, were identified. Because the cognitive distortions appeared to operate across subjects in a discontinuous, nonlinear fashion, future analyses of the present data set employing statistical techniques such as analysis of covariance (ANCOVA) or repeated measures multiple analysis of variance (MANOVA), and discriminant function analysis may yet reveal useful information. Further research, however, investigating illness-specific cognitive distortions with information processing paradigms comparing DSM-III-R diagnosed hypochondriacs to individuals with subclinical levels of hypochondriacal concern and normals, appears warranted.

REFERENCES

- Adams, S. (1993). The role of stress, social support, and psychopathology in primary care utilization. Unpublished doctoral dissertation, Louisiana State University, Baton Rouge, LA.
- American Psychiatric Association. (1952). Diagnostic and statistical manual of mental disorders. Washington, D.C: Author.
- American Psychiatric Association. (1968). Diagnostic and statistical manual of mental disorders (2nd ed.). Washington, D.C.: Author.
- American Psychiatric Association. (1980). Diagnostic and statistical manual of mental disorders (3rd ed.). Washington, D.C.: Author.
- American Psychiatric Association. (1987). Diagnostic and statistical manual of mental disorders (rev. 3rd ed). Washington, D.C.: Author.
- Appleby, L. (1987). Hypochondriasis: An acceptable diagnosis? British Medical Journal, 294, 857.
- Arkes, H. R. (1991). Costs and benefits of judgment errors: Implications for debiasing. Psychological Bulletin, 110(3), 486-498.
- Banks, J. K., & Gannon, L. (1988). The influence of hardiness on the relationship between stressors and psychosomatic symptomatology. American Journal of Community Psychology, 16(1), 25-37.
- Barsky, A. J., Geringer, E., & Wool, C. A. (1988). A cognitive-educational treatment for hypochondriasis. General Hospital Psychiatry, 10, 322-327.
- Barsky, A. J., & Klerman, G. L. (1983). Overview: Hypochondriasis, bodily complaints, and somatic styles. American Journal of Psychiatry, 140, 273-283.
- Barsky, A. J., & Wyshak, G. (1989). Hypochondriasis and related health attitudes. Psychosomatics, 30, 412-420.
- Barsky, A. J., & Wyshak, G. (1990). Hypochondriasis and somatosensory amplification. British Journal of Psychiatry, 157, 404-409.
- Barsky, A. J., Wyshak, G., & Klerman, G. L. (1986). Hypochondriasis: An evaluation of the DSM-III criteria in medical outpatients. Archives of General Psychiatry, 43, 493-500.
- Barsky, A. J., Wyshak, G., & Klerman, G. L. (1990). The somatosensory amplification scale and its relationship to hypochondriasis. Journal of Psychiatric Research, 24(4), 323-334.

- Barsky, A. J., Wyshak, G., Klerman, G. L., & Latham, K. S. (1990). The prevalence of hypochondriasis in medical outpatients. Social Psychiatry and Psychiatric Epidemiology, 25, 89-94.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). Cognitive therapy of depression: A treatment manual. New York: Guilford Press.
- Bianchi, G. N. (1971). Origins of disease phobia. Australian & New Zealand Journal of Psychiatry, 5, 241-257.
- Bianchi, G. N. (1973). Patterns of hypochondriasis: A principal components analysis. British Journal of Psychiatry, 122, 541-548.
- Bower, G. H. (1981). Mood and Memory. American Psychologist, 36, 129-148.
- Bower, G. H. (1983). Affect and cognition. Philosophical transactions of the Royal Society, London, B302, 387-402.
- Brantley, P. J., & Jones, G. N. (1988). Weekly Stress Inventory, Unpublished manual. 1988.
- Brantley, P. J., & Jones, G. N. (1989). Daily Stress Inventory Professional Manual. Lutz, FL: Psychological Assessment Resources.
- Brantley, P. J., Waggoner, C. D., Jones, G. N., & Rappaport, N. B. (1987). A daily stress inventory: Development, reliability, and validity. Journal of Behavioral Medicine, 10, 61-74.
- Brink, T. L. (1982). Geriatric depression and hypochondriasis: Incidence, interaction, assessment and treatment. Psychotherapy, Theory, Research and Practice, 19(4), 506-511.
- Broadbent, D., & Broadbent, M. (1988). Anxiety and attentional bias: State and trait. Cognition and Emotion, 2(3), 165-183.
- Broadbent, D., Broadbent, M., & Jones, J. (1986). Performance correlates of self-reported cognitive failure and of obsessionality. British Journal of Clinical Psychology, 25, 285-299.
- Brown, H. N., & Valliant, G. E. (1981). Hypochondriasis. Archives of Internal Medicine, 141, 723-726.
- Bush, L. K., Hess, U., & Wolford, G. (1993). Transformations for within-subject designs: A Monte Carlo investigation. Psychological Bulletin, 113(3), 566-579.

- Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. Advances in Behavior Therapy, 5, 51-62.
- Butler, G., & Mathews, A. (1987). Anticipatory anxiety and risk perception. Cognitive Therapy and Research, 11(5), 551-565.
- Carver, C. S., & Scheier, M. F. (1981). Attention and self-regulation: A control-theory approach to human behavior. New York: Springer.
- Cioffi, D. (1991). Beyond attentional strategies: A cognitive-perceptual model of somatic interpretation. Psychological Bulletin, 109(1), 25-41.
- Costa, Jr., P. T., & McCrae, R. R. (1985). Hypochondriasis, neuroticism and aging: When are somatic complaints unfounded? American Psychologist, 40, 19-28.
- Crocker, L., & Algina, J. (1986). Introduction to classical and modern test theory. New York: Holt, Reinhart, & Winston, Inc.
- Davis, P. J., & Schwartz, G. E. (1987). Repression and the inaccessibility of affective memories. Journal of Personality and Social Psychology, 52(1), 155-162.
- DeAlcaron, R. (1964). Hypochondriasis and depression in the aged. Gerontology Clinic, 6, 266-267.
- DeLongis, A., Coyne, J. C., Dakof, G., Folkman, S., & Lazarus, R. S. (1982). Relationship of daily hassles, uplifts, and major life events to health status. Health Psychology, 1, 119-136.
- Ehlers, A., Margraf, J., Davies, S., Roth, W. T. (1988). Selective processing of threat cues in subjects with panic attacks. Cognition and Emotion, 2, 201-219.
- Fava, G. A., Kellner, R., Zielezny, M., & Grandi, S. (1988). Hypochondriacal fears and beliefs in agoraphobia. Journal of Affective Disorders, 14, 239-244.
- Fox, E. (1992). Allocation of visual attention and anxiety. Cognition and Emotion, 7(2), 207-215.
- Fox, E. (1993). Attentional bias in anxiety: Selective or not? Behaviour Research and Therapy, 31(5), 487-493.
- Francis, W. N., & Kucera, H. (1982). Frequency analysis of English usage: Lexicon and grammar. Boston: Houghton Mifflin.
- Graham, J. R. (1987). The MMPI: A practical guide (2nd ed.). New York: Oxford University Press.

- Hanback, J. W., & Revelle, W. (1978). Arousal and perceptual sensitivity in hypochondriacs. Journal of Abnormal Psychology, 87, 523-530.
- Hitchcock, P. B., & Mathews, A. (1992). Interpretation of bodily symptoms in hypochondriasis. Behaviour Research and Therapy, 30(3), 223-234.
- Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. Journal of Psychosomatic Research, 11, 213-218.
- Hope, D. A., Rapee, R. M., Heimberg, R. G., & Dombek, M. (1990). Representations of the self in social phobia: Vulnerability to social threat. Cognitive Therapy and Research, 14(2), 177-189.
- Hylar, S. E., & Sussman, N. (1984). Somatoform disorders: Before and after DSM-III. Hospital and Community Psychiatry, 35, 469-478.
- Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. Journal of Personality and Social Psychology, 45(1), 20-31.
- Kahneman, D., Slovic, P., & Tversky, A. (Eds.). (1982). Judgment under uncertainty: Heuristics and biases. Cambridge: Cambridge University Press.
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress management: Daily hassles and uplifts versus major life events. Journal of Behavioral Medicine, 4, 1-39.
- Kellner, R. (1985). Functional somatic symptoms and hypochondriasis: A survey of empirical studies. Archives of General Psychiatry, 42, 821-833.
- Kellner, R. (1986). Somatization and hypochondriasis. New York: Praeger.
- Kellner, R., Abbott, P., Winslow, W. W., & Pathak, D. (1987). Fears, beliefs and attitudes in DSM-III hypochondriasis. Journal of Nervous and Mental Disease, 175, 20-25.
- Kellner, R. & Schneider-Braus, K. (1988). Distress and attitudes in patients perceived as hypochondriacal by medical staff. General Hospital Psychiatry, 10, 157-162.
- Kenyon, F. E. (1964). Hypochondriasis: A clinical study. British Journal of Psychiatry, 110, 478-488.
- Kenyon, F. E. (1976). Hypochondriacal states. British Journal of Psychiatry, 129, 1-14.

- Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal, and coping. New York: Springer.
- Lewinsohn, P. M., & Lee, W. M. I. (1981). Assessment of affective disorders. In D. H. Barlow (Ed.), Behavioral assessment of adult disorders, pp. 129-179. New York: Guilford.
- Lichtenstein, S., Slovic, P., Fischhoff, W., Layman, M., & Combs, B. (1978). Judged frequency of lethal events. Journal of Experimental Psychology, Human Learning and Memory, 4, 551-578.
- Logan, A. C., & Goetsch, V. L. (1993). Attention to external threat cues in anxiety states. Clinical Psychology Review, 13, 541-559.
- Mabe, P. A., Hobson, D. P., Jones, I. R., & Jarvis, R. G. (1988). Hypochondriacal traits in medical inpatients. General Hospital Psychiatry, 10, 236-244.
- Mathews, A. (1990). Why worry? The cognitive function of anxiety. Behaviour Research and Therapy, 28(6), 455-468.
- Mathews, A., & MacLeod, C. (1985). Selective processing of threat cues in anxiety states. Behaviour Research and Therapy, 23, 563-569.
- Mathews, A., May, J., Mogg, K., & Eysenck, M. (1990). Attentional bias in anxiety: Selective search or defective filtering? Journal of Abnormal Psychology, 99(2), 166-173.
- MacLeod, C., & Mathews, A. (1988). Anxiety and the allocation of attention to threat. The Quarterly Journal of Experimental Psychology, 40A, 653-670.
- MacLeod, C., & Mathews, A. (1991). Biased cognitive operations in anxiety: Accessibility of information or assignment of processing priorities? Behaviour Research and Therapy, 29(6), 599-610.
- MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. Journal of Abnormal Psychology, 95(1), 15-20.
- McCranie, E. J. (1979). Hypochondriacal neurosis. Psychosomatics, 20(1), 11-15.
- McKinley, J. C., & Hathaway, S. R. (1940). A multiphasic personality schedule (Minnesota):II: A differential study of hypochondriasis. Journal of Psychology, 10, 255-268.
- McNally, R. J., Kaspi, S. P., Riemann, B. C., & Zeitlin, S. B. (1990). Selective processing of threat cues in posttraumatic stress disorder. Journal of Abnormal Psychology, 99, 398-402.

- McNally, R. J., Riemann, B. C., & Kim, E. (1990). Selective processing of threat cues in panic disorder. Behaviour Research and Therapy, 28(5), 407-412.
- Mechanic, D. (1972). Social psychologic factors affecting the presentation of bodily complaints. New England Journal of Medicine, 286, 1132-1139.
- Mechanic, D., & Volkart, E. (1960). Illness behavior and medical diagnoses. Journal of Health and Human Behavior, 1, 86-94.
- Mechanic, D., & Volkart, E. H. (1961). Stress, illness behavior, and the sick role. American Sociological Review, 26, 51-58.
- Merskey, H. A., & Evans, P. R. (1975). Variations in pain complaint threshold in psychiatric and neurological patients with pain. Pain, 1, 73-79.
- Miranda, J., & Dwyer, E. V. (1993). Cognitive behavioral therapy for disadvantaged medical patients. The Behavior Therapist, 16(9), 226-228.
- Miranda, J., Perez-Stable, E. J., Munoz, R. F., Hargreaves, W., & Henke, C. J. (1991). Somatization, psychiatric disorder, and stress in utilization of ambulatory medical services. Health Psychology, 10(1), 46-51.
- Mogg, K., Mathews, A., Bird, C., & Macgregor-Morris, R. (1990). Effects of stress and anxiety on the processing of threat stimuli. Journal of Personality and Social Psychology, 6, 1230-1237.
- Mogg, K., Mathews, A., & Weiman, J. (1989). Selective processing of threat cues in anxiety states: A replication. Behaviour Research and Therapy, 27, 317-323.
- Mullen, B., & Suls, J. (1982). The effectiveness of attention and rejection as coping styles: A meta-analysis of temporal differences. Journal of Psychosomatic Research, 26, 43-49.
- Nemiah, J. C. (1977). Alexithymia. Psychotherapy and Psychosomatics, 28, 199-206.
- Noyes, R., Reich, J., Clancy, J., & O'Gorman, T. W. (1986). Reduction in hypochondriasis with treatment of panic disorder. British Journal of Psychiatry, 149, 631-635.
- Orme, J. G., Reis, J., & Herz, E. J. (1986). Factorial and discriminant validity of the Center for Epidemiological Studies - Depression (CES-D) scale. Journal of Clinical Psychology, 42, 28-33.

- Parsons, T. (1951). Illness and the role of the physician: A sociological perspective. American Journal of Orthopsychiatry, 21, 452-460.
- Pennebaker, J. W. (1982). The psychology of physical symptoms. New York: Springer-Verlag.
- Petrie, A. (1978). Individuality in pain and suffering (2nd ed.). Chicago: University of Chicago Press.
- Pilowsky, I. (1967). Dimensions of hypochondriasis. British Journal of Psychiatry, 113, 89-93.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement, 1, 385-401.
- Reference Software International. (1989). Grammatik IV. San Francisco, CA: Author.
- Rehm, L. P. (1988). Assessment of depression. In A. S. Bellack & M. Hersen (Eds.), Behavioral assessment: A practical handbook (3rd ed., pp. 313-364). New York: Pergamon.
- Rodin, J. (1978). Somatophysics and attribution. Personality and Social Psychology Bulletin, 4(4), 531-537.
- Ross, A. (1991). Growth without progress. Contemporary Psychology, 36, 743-744.
- Salkovskis, P. M., & Warwick, H. M. C. (1986). Behavioural treatment of illness phobia and hypochondriasis. Behaviour Research and Therapy, 152, 239-241.
- Salovey, P., & Birnbaum, D. (1989). Influence of mood on health-related cognitions. Journal of Personality and Social Psychology, 57(3), 539-551.
- Schneider, W. (1988). Micro Experimental Laboratory: An integrated system for IBM PC compatibles. Behavior Research Methods, Instruments, & Computers, 20(2), 206-217.
- Stroop, J. R. (1935). Studies of interference in serial verbal reactions. Journal of Experimental Psychology, 225, 643-662.
- Teasdale, J. (1993). Emotion and two kinds of meaning: Cognitive therapy and applied cognitive science. Behaviour Research and Therapy, 31(4), 339-354.
- Treisman, A. M. (1969). Strategies and models of selective attention. Psychology Review, 76, 282-299.

- Turkat, I. D., & Pettegrew, L. S. (1983). Development and validation of the Illness Behavior Inventory. Journal of Behavioral Assessment, 5(1), 35-47.
- Turner, S. M., Jacob, R. G., & Morrison, R. (1984). Somatoform and factitious disorders. In H. E. Adams & P. B. Sutker (Eds.), Comprehensive handbook of psychopathology (pp. 307-345). New York: Plenum.
- Tyrer, P., Lee, I., & Alexander, J. (1980). Awareness of cardiac function in anxious, phobic and hypochondriacal patients. Psychological Medicine, 10, 171-174.
- Wahler, H. J. (1983). The Wahler Physical Symptoms Inventory Manual. Los Angeles: Western Psychological Services.
- Warwick, H. C. (1989). A cognitive-behavioural approach to hypochondriasis and health anxiety. Journal of Psychosomatic Research, 33(6), 705-711.
- Warwick, H. C., & Salkovskis, P. M. (1990). Hypochondriasis. Behaviour Research and Therapy, 28, 105-117.
- Watts, F. N., McKenna, F. P., Sharrock, R., & Trezise, L. (1986). Colour naming of phobia-related words. British Journal of Psychiatry, 77, 97-108.
- Williams, J. M. G., Watts, F. N., MacLeod, C., & Mathews, A. (1988). Cognitive psychology and emotional disorders. Chichester: Wiley.
- Woodcock, R. W., & Johnson, M. B. (1977). Woodcock-Johnson Psycho-educational Battery. Allen, Texas: DLM Teaching Resources.
- Wright, D. D., Kane, R. L., Olsen, D. M., & Smith, T. J. (1977). The effects of selected psychosocial factors on the self-reporting of pulmonary symptoms. Journal of Chronic Diseases, 30, 195-206.
- Yantis, S., & Johnston, J. C. (1990). On the locus of visual selection: Evidence from focused attention tasks. Journal of Experimental Psychology: Human Perception and Performance, 16, 135-149.
- Zonderman, A. B., Heft, M. W., & Costa, Jr., P. T. (1985). Does the Illness Behavior Questionnaire measure abnormal illness behavior? Health Psychology, 4(5), 425-436.

APPENDIX A
DEMOGRAPHIC AND MEDICAL STATUS QUESTIONNAIRE

DEMOGRAPHIC AND MEDICAL STATUS QUESTIONNAIRE

Age _____

Sex: M _____ F _____

Race: Black _____ White _____ Other _____

Marital Status: Single _____ Married _____

Highest Level of Education Completed: Annual Income of Household:

_____ some high school	_____ 70,000+
_____ high school graduate	_____ 60,000 - 70,000
_____ some college/university	_____ 50,000 - 60,000
_____ college/university graduate	_____ 40,000 - 50,000
_____ graduate/professional school	_____ 30,000 - 40,000
	_____ 20,000 - 30,000
	_____ 10,000 - 20,000
	_____ 10,000 or less

How long have you been a patient at this clinic? _____

What is the reason for your appointment today? (check one)

_____ Problem with a long-standing illness (e.g., diabetes)

_____ Problem with a recent illness (e.g., flu)

_____ Routine Health Maintenance (e.g., physical exams for employment, immunizations, contraception, routine pap smears, pregnancy tests)

Has a physician ever diagnosed you with a really serious illness that could threaten your life? _____no _____yes

If yes, please explain _____

APPENDIX B
PHYSICIAN RATING SCALE

PHYSICIAN RATING SCALE

Physician: _____

Subject Number: _____

EKL#: _____

What was the reason for this patient's clinic visit today?

_____ Chronic Diagnostic Problem (e.g., Hypertension, Asthma)

_____ Acute Diagnostic Problem (e.g., Urinary Tract Infection)

_____ Undiagnosed Complaint or Symptom (e.g., Back Pain)

_____ Routine Health Maintenance (e.g., physical exams for employment, immunizations, contraception, routine pap smears, pregnancy tests)

Please rate the patient's global health status using the following scale by circling the number which best describes the patient's overall physical health **FOR THE PAST 12 MONTHS:**

- 0 - patient is in good physical health with a history of only routine minor illnesses
- 1 - patient is largely free of serious medical problems but presents with numerous undiagnosed symptoms and complaints
- 2 - patient is largely free of serious medical problems but has one or more risk factors (e.g., smoking) which places him/her at risk for the development of future illness
- 3 - patient has a history of serious disease which is currently in remission - patient appears in good health and is compliant with medical recommendations
- OR
- patient has a chronic-degenerative disease (e.g., diabetes) which is well-controlled and patient is compliant with medical recommendations
- 4 - patient has a history of serious disease which is currently in remission - but patient is noncompliant, engages in health risk behaviors, or has additional aggravating illnesses
- 5 - patient currently has one or more chronic-degenerative disease(s) which is poorly controlled resulting in an increased probability of morbidity
- 6 - patient has a terminal illness; death is imminent

APPENDIX C
SUBJECTIVE RISK QUESTIONNAIRE

SUBJECTIVE RISK QUESTIONNAIRE

DIRECTIONS: Below are a number of events which could possibly occur to you sometime in the future. For each event, please estimate the likelihood that the situation could occur to you by using the scale at the top of each page to rate the event on a scale from 0 to 8. Record your response by placing a number in the blank next to the item. This number should reflect your opinion on how likely you believe the event will happen to you. Before answering any question, please review the scale.

0	1	2	3	4	5	6	7	8
-----	-----	-----	-----	-----	-----	-----	-----	-----
Almost Impossible	A Little Likely		Moderately Likely		Very Likely		Almost Certain	

1. What is the probability that you will be happily married in 5 years? _____
2. What is the probability that you will be short on cash and be unable to pay one of your electricity bills on time next year? _____
3. What is the probability that you will be physically active in 20 years? _____
4. What is the probability that you will be lonely in your old age? _____
5. What is the probability that someone will give you money for your birthday next year? _____
6. What is the probability that you will die of a heart attack? _____
7. What is the probability that you will make any new friends this year? _____
8. What is the probability that you will lose your wallet in the next 20 years? _____
9. What is the probability that you will feel in peak physical condition this year? _____
10. What is the probability that you will not be on speaking terms with a member of your family in the next ten years? _____
11. What is the probability that you will win the Louisiana lottery in the next five years? _____

12. What is the probability that you will develop pneumonia in the next five years? _____
13. What is the probability that you will be praised in the newspaper in the next 20 years? _____
14. What is the probability that the IRS will audit your income tax returns in your lifetime? _____
15. What is the probability that your doctor will give you a clean bill of health in 15 years? _____
16. What is the probability that you will be rejected by your best friend next year? _____
17. What is the probability that your income will increase in the next 5 years? _____
18. What is the probability that you will ever contract AIDS? _____
19. What is the probability your friends and family will value your opinion and seek your advice in 20 years? _____
20. What is the probability that you will be successfully sued in the next 10 years? _____
21. What is the probability that you will live to be 100? _____
22. What is the probability that you will be divorced in 20 years? _____
23. What is the probability that you will ever find \$100 on the street? _____
24. What is the probability that you will have to cut back on activities in the next five years because of poor health? _____
25. What is the probability that you will receive a "citizen of the month" award sometime in your life? _____
26. What is the probability that you will have to file for bankruptcy in the next 20 years? _____
27. What is the probability that you would not become sick if you were exposed to the flu next year? _____
28. What is the probability that a friend will criticize you in the next 5 years? _____

29. What is the probability that you will be debt-free in 15 years?

30. What is the probability that you will develop cancer within the next 20 years?

APPENDIX D

DISTRACTOR WORDS USED FOR ATTENTIONAL BIAS TASK BY CATEGORY

DISTRACTOR WORDS USED FOR ATTENTIONAL BIAS TASK BY CATEGORY

ILLNESS	SOCIAL	NEUTRAL	POSITIVE
AIDS	LOSER	HANGER	JACKPOT
CARDIAC	IDIOT	QUILT	CAVIAR
COMA	JEALOUS	BROOM	LOTTERY
RASH	COWARD	SKILLET	RUBY
ALLERGY	SNEER	BATHTUB	TUXEDO
NAUSEA	TIMID	NAPKIN	CASINO
VOMIT	CLUMSY	SPOON	JEWEL
SNEEZE	DISGUST	OVEN	VELVET
SPASM	DECEIVE	CHIMNEY	LIMO
GERM	OFFEND	HAMMER	MINK
CRAMP	TEASE	SPONGE	SATIN
INFECT	ANNOY	BUCKET	FEAST
DIZZY	ENVY	PILLOW	CRUISE
ULCER	INSULT	STEREO	BANQUET
SEIZURE	PUNISH	DRAWER	EMERALD
SURGERY	MOCK	ATTIC	PEARL
ITCH	FOOLISH	TOWEL	YACHT
COUGH	GOSSIP	STOVE	LACE
DEAF	RUMOR	BASKET	CASTLE
CRIPPLE	ASHAMED	CLOSET	MANSION
SORE	UGLY	CARPET	PERFUME
VIRUS	FROWN	SHELF	SILK
ACHE	STUPID	CURTAIN	DIAMOND
BLEED	LONELY	CABINET	FURS
POISON	GUILTY	LAMP	IVORY
FEVER	ABUSE	FORK	RESORT
CHOKES	DISLIKE	CLOCK	INHERIT
ILLNESS	BORED	MIRROR	WEALTH
CANCER	CURSE	DISHES	LUXURY
FAINT	DIVORCE	PENCIL	LEATHER
TUMOR	BLAME	BLANKET	FORTUNE
STROKE	ACCUSE	BENCH	SILVER
INJURY	ANGRY	PLATE	CRYSTAL
HURT	AFRAID	CAMERA	CASH
SICK	IGNORE	STAIR	GOLD
BLIND	HATE	PHONE	ESTATE
DISEASE	ARGUE	ROOF	RICH
PAIN	FIRE	DESK	BANK
OPERATE	AVOID	CHAIR	DOLLARS
DEATH	FAILURE	WINDOW	MONEY

APPENDIX E
CONSENT FORM

CONSENT FORM

PERFORMANCE SITES: Subjects for this study will be obtained from the Family Practice Clinic at the Louisiana State University Medical Center in Baton Rouge at Earl K. Long Medical Center. For 24-hour access, please contact 358-1105

PURPOSE OF THE STUDY:

- A. This project is a research study.
- B. Individuals who agree to participate as research subjects in this project will not be treated in any way that is different from other patients at this clinic, other than completing the questionnaires and experimental task described below (see #7). Participation in this project as a research subject will not in any way affect or otherwise alter medical care received at this clinic.
- C. This study is designed to investigate how health status, attitudes toward health, mood, and stress influence thinking and use of health care resources in family practice patients.

SUBJECT INCLUSION CRITERIA: Individuals are eligible to participate in the study if they are: between 21 and 65 years of age and if they have been patients at the Family Practice Clinic for at least one year.

SUBJECT EXCLUSION CRITERIA: Individuals will not be eligible to participate in the study if they currently have a terminal illness (e.g., cancer). Individuals will also be excluded from participation if they are unable to read for any reason (e.g., illiterate or because of poor eyesight or because reading glasses were left at home). Individuals may participate only once in this project.

DESCRIPTION OF THE STUDY: Volunteers will be recruited from patients visiting the Family Practice Clinic. Subjects will complete the study while waiting for their regularly scheduled clinic appointments. After giving informed consent, eligible subjects will be asked to complete a packet containing a demographic questionnaire and measures of: attitudes toward health, health status, daily stress, mood, and estimates of future events. In addition, each subject's Family Practice physician, and another physician who will review each subject's medical chart, will provide the experimenter with health status ratings. Information will also be obtained about the frequency of clinic attendance. Neither physician, however, will have knowledge of the subjects' questionnaire responses. After completing the questionnaires, each subject will be asked to participate in a computer task assessing the extent to which attention is captured by certain topics. Subjects should be able to complete the study in approximately 45 minutes. About 200 patients will participate in the study.

BENEFITS TO SUBJECTS: Potential benefits which may result from this research include: information leading to better understanding of factors related to the use of health care resources and improved

methods for helping patients learn to cope with these factors. Subjects actually participating in the study, however, will receive no direct benefits.

RISKS TO SUBJECTS: There are no known major physical, psychological, and/or social risks or discomforts that might occur to subjects as a result of this study. Participation in this study, however, may involve unforeseen risks. Lesser risks can be explained if subjects ask for this information. If subjects wish, the experimenter can provide a referral for additional assistance. Patients should not expect their medical condition to improve with participation in this study.

ALTERNATIVES TO PARTICIPATION IN THE STUDY: Participation is voluntary. Patients who do not participate will attend their clinic appointments as usual.

SUBJECT REMOVAL: There are no foreseeable circumstances under which eligible subjects would be removed from the study against their wishes. Subjects will be forced to withdraw only if they become physically unable (e.g., due to sudden illness) to complete the experimental tasks described above.

SUBJECTS' RIGHT TO REFUSE TO PARTICIPATE OR WITHDRAW: Study subjects may refuse to participate or withdraw from the study at any time without jeopardizing, in any way, their medical treatment at this institution in the present or future. Should significant new findings develop during the course of the research which may relate to the subject's willingness to continue participation, that information will be provided to the subject.

SUBJECTS' RIGHT TO PRIVACY: The results of the study may be released to the funding agency. The results of the study may also be published. The privacy of subjects, however, will be protected and they will not be identified in any way.

RELEASE OF INFORMATION: The medical records related to the study are available to the sponsoring agency. By agreeing to participate in this research study and by signing this consent form, the subject a.) gives permission for his/her Family Practice physician to release health status ratings to the experimenter, and b.) gives permission for another physician to review the subject's medical chart and provide similar information on health status and frequency of clinic visits to the experimenter.

FINANCIAL INFORMATION:

A. Participation in this study will not result in any extra charges above and beyond those routinely incurred by patients with similar illnesses.

B. The costs of study-related and unforeseen complications must be met by subjects.

C. Subjects who complete the study will be paid \$5.00 for their participation. If subjects choose to withdraw from the study prematurely, they will be partially compensated with an amount based upon percent of time completed, not to exceed \$2.00.

SIGNATURES: The study has been discussed with me and all my questions have been answered. I agree with the terms above and acknowledge that I have been given a copy of the consent form.

Signature of Subject

Date

Signature of Witness

Date

VITA

Polly Hitchcock was born in Corpus Christi, Texas on May 3, 1956. She grew up in San Antonio, Texas where she graduated from Robert E. Lee High School in 1974. She received her B.A. in psychology from the University of Texas at Austin in December, 1977. She later attended the program in clinical psychology at the University of Texas at El Paso and graduated with her M.A. in August, 1984. After working for a few years in the mental health field, she enrolled in the Ph.D. clinical psychology program at Louisiana State University in the Fall of 1987. She later attended the Brown University Clinical Psychology Internship Consortium in Providence, Rhode Island. Upon completion of her dissertation in the Fall of 1993, she was working as a Visiting Assistant Professor at Texas A&M University in College Station, Texas.

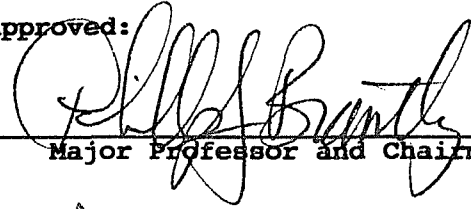
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Polly Hitchcock

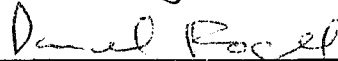
Major Field: Psychology

Title of Dissertation: Attentional Bias and Subjective Risk
in Hypochondriacal Concern

Approved:

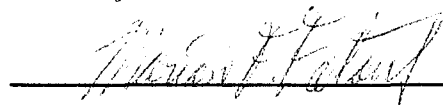
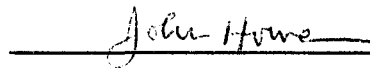
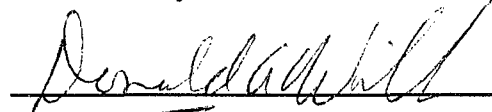


Major Professor and Chairman



Dean of the Graduate School

EXAMINING COMMITTEE:



Date of Examination:

October 27, 1993